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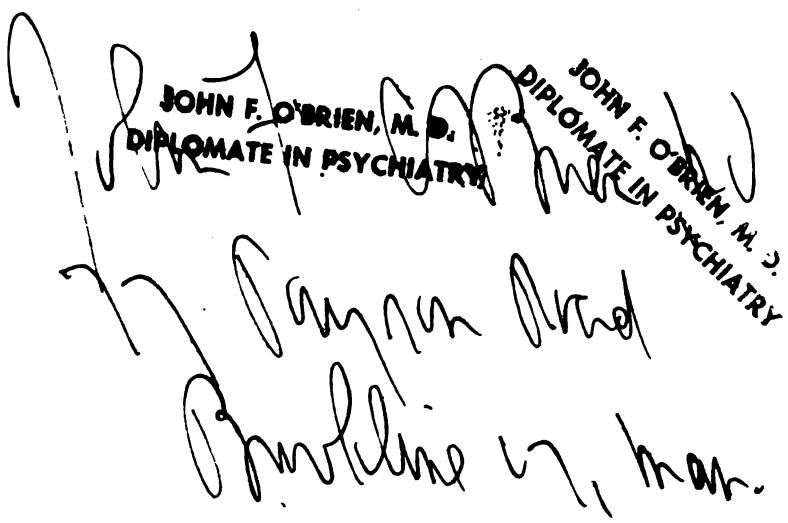

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NERVOUS AND MENTAL DISEASE MONOGRAPH SERIES, NO. 12

Cerebellar Functions

BY

DR. ANDRÉ-THOMAS

(Ancient Interne des Hopitaux de Paris)

TRANSLATED BY

W. CONYERS HERRING, M.D., of New York

With 89 figures in the text

NEW YORK

THE JOURNAL OF NERVOUS AND MENTAL DISEASE

PUBLISHING COMPANY

1912

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NERVOUS AND MENTAL DISEASE MONOGRAPH SERIES

Edited by
Drs. SMITH ELY JELLIFFE and WM. A. WHITE

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THE FUNCTIONS OF THE CEREBELLUM

FIRST PART

EXPOSITION OF FACTS

CHAPTER I

ANATOMY OF THE CEREBELLUM

I. The Architecture of the Cerebellum

The cerebellum is an unpaired median symmetrical organ, situated, in man, below the *cerebral hemispheres* which cover it entirely, behind the *corpora quadrigemini*, and above the *pons Varolii* and the *medulla oblongata* in which it makes a deep groove or concavity and which it overlaps largely on the sides.

With its furrowed and lamellated appearance it is related to all the other parts of the central nervous system in which, by volume, it occupies the second place; it is but a misnomer to call it the "little brain" or "Kleinhirn" as do the Germans as this name is neither justified by morphology, histology nor physiology.

The cortex of the cerebellum or the cerebellar mantle, which is demonstrated by a simple macroscopic examination, constitutes but one portion of the organ; a series of longitudinal or sagittal sections gives immediately an important idea of its architecture. From the surface towards the interior one can distinguish: (1) the cerebellar cortex; (2) a thick layer of white matter; (3) collections of gray matter or central gray nuclei. In man there are four of these nuclei for each half of the organ, the *corpus rhomboideum* or cerebellar olive also called the *corpus dentatum*, the *nucleus fastigii*, the *nucleus globulosus* and the *nucleus em-*

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boliformis (Fig. 3). Certainly the cortex and the nuclei have, as we shall see further on, very intimate relations with one another, but their configuration and their structure is so dissimilar that they must be looked upon as distinct organs. This should be the same with the cerebellum as with the cerebrum. In each cerebral hemisphere does not one distinguish—as well from the point of view of structure as of function—the cortex and the central nuclei? All the more reason to do the same for the cerebellum in which the cortex is so distinctly differentiated from the rest by its external appearance as well as by its histological structure.

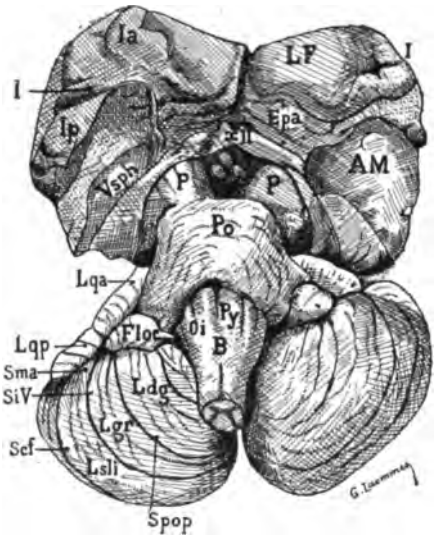

FIG. 1. Section of Meynert. Inferior surface of the cerebellum. (After a photograph.)

AM, anterior wall; *B*, medulla; *Cv*, hemispheres of the cerebellum; *Epa*, anterior perforated space; *Fe* bundle of Férré; *Floc*, flocculus; *I*, insula; *i*, fissure of the insula; *Ia*, anterior convolutions of the insula; *Ip*, posterior convolution of the insula; *LF*, frontal lobe; *LT*, temporal lobe; *Lc*, central lobe; *Ldg*, digastric lobe; *Lgr*, lobus gracilis.

This conception is however not only anatomical but physiological as well; there will be occasion to investigate whether there are differences observed between the symptoms which are produced by the simple destruction of the cortex in animals and

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man, and those produced by the total destruction of the organ (both cortex and central gray nuclei), between the phenomena produced by the excitation of the cortex and of those which follow the irritation of the central nuclei. To sum up, the cerebellar cortex is an organ and the central gray nuclei are other organs; there exist relations, both anatomical and physiological, between the two, but nevertheless they enjoy an independence sufficiently marked to consider them as distinct organs.

The cerebellum is formed of a median or central part, the vermis or median lobe, and of two lateral parts, the lateral lobes or hemispheres.

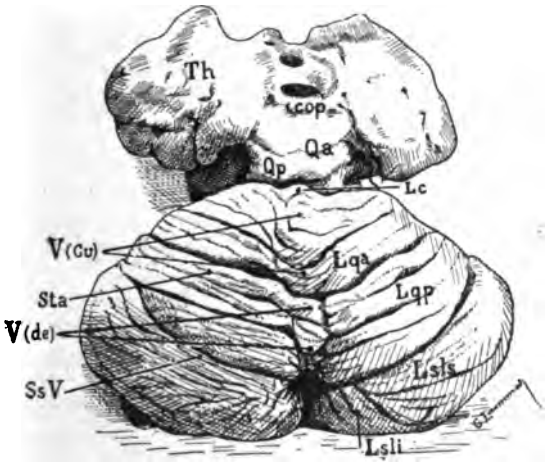

FIG. 2. Section of Meynert. Superior surface of the cerebellum. *Lqa*, anterior quadrilateral lobe; *Lqp*, posterior quadrilateral lobe; *Lsli*, inferior semi-lunar lobe; *Lsls*, superior semi-lunar lobe; *NA*, nucleus amygdalus; *P*, foot of the peduncle; *pFL*, falciform fold of Broca; *Scf*, circumferential fissure of Vicq d'Azyr; *SiV*, inferior fissure; *Sma*, anterior marginal groove; *SsV*, superior fissure; *Sta*, anterior transverse fissure; *Vcu*, culmen; *Vde*, declive; *Vsph*, sphenoidal ventricle; *XII*, optic chasm.

The vermis in the animal series is the most constant part of the cerebellum; it alone exists in the inferior vertebrates (fishes, reptiles), and also in the great majority of birds. It is only in the mammalia that the lateral lobes, rudimentary in certain types of birds, compare in their development with the vermis. Edinger, from the point of view of phylogenetic evolu-

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tion, joins the vermis and the flocculus under the name of paleocerebellum; the lateral lobes which appear later form the neocerebellum.

In man the limits between the hemispheres and the vermis on the superior surface are somewhat indistinct; this is not so on the inferior surface, where the pyramids are clearly separated from the hemispheres on each side by a deep groove. The superior surface of the vermis is called the superior vermis and the inferior surface the inferior vermis.

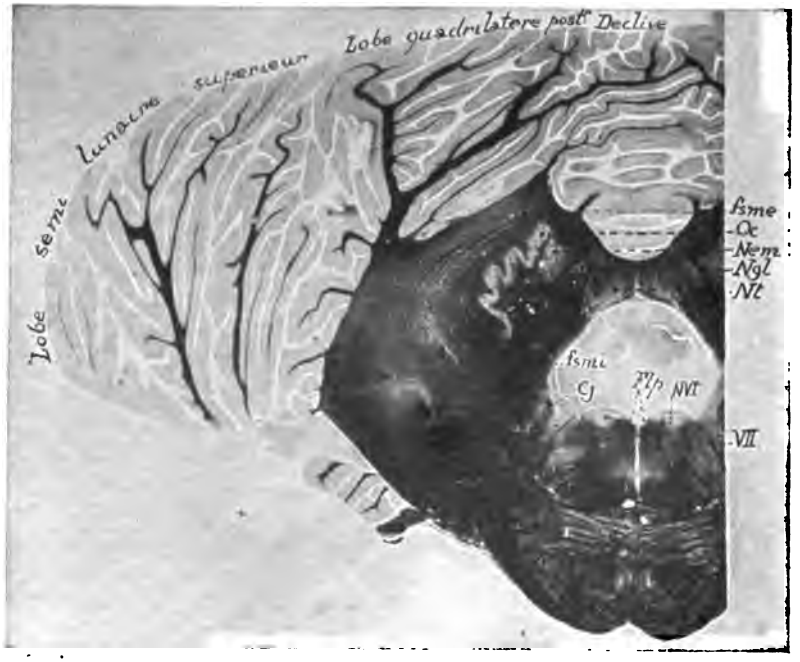

FIG. 3. Photograph of a section of the pons and the cerebellum of man. (Stained Wiegert-Pal.)

Cj, juxta-restiform body; *Flp,* posterior longitudinal bundle; ***fsme, fsmi,*** arcuate fibers, external, internal; *Nem,* embolus; *Ngl,* globulus; *Nt,* nucleus fastigii; *Oc,* cerebellar olive; *Pci,* inferior cerebellar peduncle; *Pcm,* middle cerebellar peduncle; *NVI,* nucleus of sixth nerve; *VII,* facial.

In animals they are respectively the posterior and anterior vermis. A detailed description of the fissures and lobes does not

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come within the scope of this work. It is only necessary to remember that the cerebellum is divided by several deep fissures into lobes; these are divided by less pronounced fissures into lobules and these in their turn into lamellæ. The fissures of the vermis are less deep than of the lateral hemispheres, nevertheless there is an apparent continuity between the lamellæ of the cerebellar hemispheres and those of the vermis, so that each lobe comprised between two deep fissures may be considered as being formed of a vermian and two hemispheric parts. This conception, however, is purely anatomical, for physiologically it seems preferable not to confound the hemispheres and the vermis.

M. and Mme. Dejerine distinguish five primordial lobes in the cerebellum of man: (1) superior lobe or lobe of the principal mass of the vermis; (2) posterior lobe, or lobe of the transverse lobule; (3) inferior lobe or lobe of the pyramid; (4) infero-internal lobe, or lobe of the uvula; (5) infero-anterior lobe or lobe of the nodule.

Each of these lobes comprises a vermian and a hemispheric portion. The superior lobe is divided into four secondary lobes. The lobe of the lingula, central lobe, lobe of the culmen and lobe of the declive. The lobe of the lingula is represented in the vermis by the lingula and in the hemispheres by the frenulæ of the lingula; in the same way the central lobe comprises the central lobule and the alæ of the central lobule. The lobe of the culmen, the culmen and the anterior portion of the quadrilateral lobe; the lobe of the declive represents the declivus and the posterior portion of the quadrilateral lobe.

The posterior lobe is subdivided into the superior lobe of the transverse lamellæ (folium cacuminis in the vermis and superior semilunar lobe in the hemispheres), and the lobe of the inferior transverse lamellæ (tuber valvulæ in the vermis and the inferior semilunar lobe and the lobus gracilis in the hemispheres), the inferior lobe or lobe of the pyramid comprises the pyramid in the vermis and the digastric lobe in the hemispheres.

The infero-internal lobe or the lobe of the uvula is formed by the uvula in the vermis, and the tonsils in the hemispheres.

Finally the infero-anterior lobe or lobe of the nodule is represented in the vermis by the nodule and in the hemispheres by the flocculus.

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The figures 1 and 2 represent the superior and inferior surfaces of the cerebellum in man.

The nomenclature of the lobes and fissures is purely anatomical. The theory of cerebellar localization, which is of very recent date, does not up to the present repose upon a basis of facts sufficiently demonstrable.

II. Histology of the Cerebellum

In the solution of a physiological problem of this order one cannot omit a consideration of the structure of the cerebellum and more particularly the knowledge that has been acquired of the connections which unite the nerve elements or different groups of cells one with another. The results obtained by staining with silver chromate by Golgi and Ramon y Cajal are of primary importance from this viewpoint (Figs. 4 and 5).

Structure of the Cortex.—Each lobe of the cortex is divided into lobules and lamellæ. The whole histology of the cortex is thus based upon that of a lamella. Each lamella is divided from the surface to the interior into: (1) the molecular layer; (2) the granular layer and (3) the white substance.

The molecular layer is occupied by star-shaped cells of two kinds, large and small. The small cells, more superficial, have the form and properties of the majority of multipolar cells. The large cells for the most part lie deeper. The axis-cylinder of the large star-shaped cells is derived from the body of the cell and takes an antero-posterior direction; after a long course it approaches a Purkinje cell around which it arborizes and forms a sort of basket or envelope (Kölliker), but before this it gives off at regular intervals collaterals which arborize in the same manner around other Purkinje cells. Each star-shaped cell of the molecular layer has thus, dependent upon it, a large number of Purkinje cells. At the limits of the molecular layer and the granular layer there are found a large number of the Purkinje cells: the largest in size of the elements of the cortex, and considered from the physiological point of view as playing the most active part.

The Purkinje cells are notable for their rich protoplasmic expansions which run through the whole thickness of the molecular layer. The body is voluminous and spherical or ovoid, it is continuous with one or two large protoplasmic arborizations upon

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which all the others are implanted. These protoplasmic arborizations or dendrites are covered with thorny projections which are perpendicularly inserted; they terminate freely. The axis cylinder is directed towards the interior, at first to the granular layer and then to the white substance, it gives off one or two collaterals which mount to the molecular layer where they end.

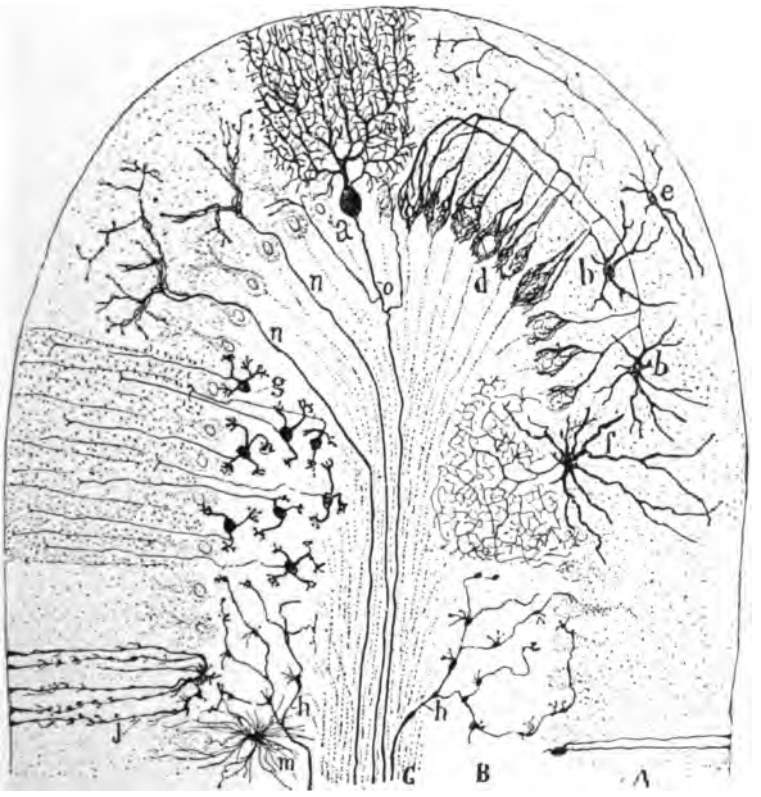

FIG. 4. Semi-schematic transverse section of a cerebellar convolution in a mammal. (After Ramon y Cajal.)

A, molecular zone; *B*, granular zone; *C*, zone of the white substance; *a*, Purkinje cell, front view; *b*, small star-shaped cells of the molecular layer; *d*, final descending arborizations which surround the cells of Purkinje; *e*, star-shaped superficial cells; *f*, large star-shaped cells of the granular layer; *g*, granules with their ascending axis-cylinders bifurcated at T; *h*, mossy fibers; *j*, neuroglia cell with branches; *m*, neuroglia cell of the granular layer; *n*, climbing fibers; *o*, ascending collaterals from the axis-cylinders of the Purkinje cells.

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The Purkinje cells contain a number of large chromatic granules and are traversed by numerous neurofibrillæ.

The granular layer is almost entirely composed of an agglomeration of small cellular elements of a spheroidal shape. Each one possesses protoplasmic prolongations and an axis-cylinder prolongation. The protoplasmic prolongations are few in number (three or four), thin, short, and terminate by a slight arborization. The axis-cylinder mounts into the molecular layer and divides in the form of a T, into two horizontal branches; each of these runs through the molecular layer for a long distance

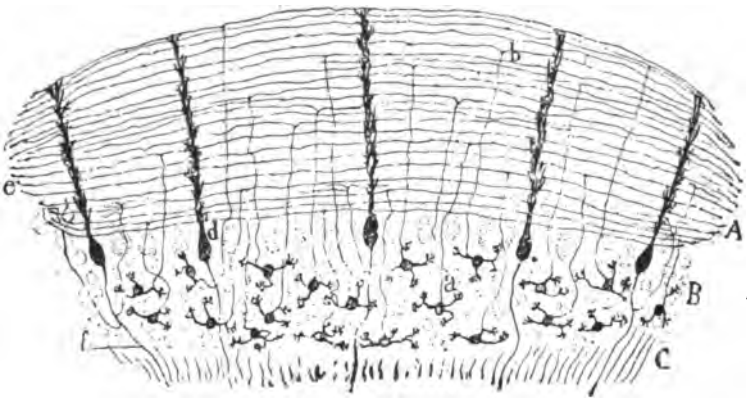

FIG. 5. Semi-schematic longitudinal section of a cerebellar convolution. (After Ramon y Cajal.)

A, molecular layer; *B*, granular layer; *C*, layer of the white substance; *a*, ascending axis-cylinders from the granules; *c*, bifurcation of this axis-cylinder and the formation of a parallel fiber; *d*, Purkinje cell seen in profile; *e*, granular terminal extremity of the parallel fibers; *f*, axis-cylinders of the Purkinje cells.

and terminates freely, but they enter into contact along the whole of their course with the terminations and protuberances of the ramifications of the Purkinje cells. In the granular layer also there are found some large star-shaped multipolar cells or cells of type II of Golgi, the axis-cylinders of which arborize very freely around the body of the cell and thus enclose in a sort of network a very large number of the "granules" or small cells of the granular layer. The protoplasmic prolongations terminate either in the granular layer or in the molecular layer.

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The white substance is formed by a mass of myelinated nerve fibers which go in opposite directions; the fibers of one kind are centrifugal and originate in the cerebellar cortex, and the others are centripetal and terminate in the cortex. The centrifugal fibers are derived entirely from the Purkinje cells which have been described.

The centripetal fibers are of two kinds: the mossy fibers of Cajal, and the climbing fibers. The mossy fibers of Cajal are so called because they present nodular thickenings bristling with short divergent expansions, which resemble the moss covering trees. They arborize in the granular layer and consequently they enter into relations with the granules.

The climbing or creeping fibers ramify principally in the molecular layer and attach themselves to the ascending arborizations of the Purkinje cells; they terminate in varicose and plexiform arborizations.

The centripetal or terminal fibers are fibers of association, peduncular fibers, and fibers of projection. The peduncular fibers originate in the middle and inferior cerebellar peduncles. It is probable, if they exist at all, that fibers which originate in the central gray nuclei are very few in number. Association fibers unite the neighboring lobules and lamellæ to one another.

The structure and the division of the neuroglia and the other interstitial elements does not offer any interest in a purely physiological study. On the other hand the light thrown by histological examinations upon the morphology of the nervous elements and their reciprocal relations is of some help in following the path of excitations from the periphery to the cerebellum, and vice versa.

The stimulus carried by a centripetal fiber is transmitted simultaneously to several Purkinje cells either directly (climbing fibers) or indirectly by the intermediation of the granules or the star-shaped cells of the molecular layer. Each Purkinje cell is in relation with neighboring Purkinje cells by means of the recurrent collaterals of the axis cylinders.

The association fibers establish functional relations between the cellular elements of neighboring lobules and lamellæ. It is finally upon the Purkinje cells that all centripetal excitations are concentrated; these elements in their turn are the only ones

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whose axis cylinders project themselves to the central gray nuclei (fibers of projection). Justly, therefore, the Purkinje cell is considered the truly active element of the cerebellar cortex.

Thus organized the cerebellar cortex appears fitted to propagate and reinforce impressions which come to it from the periphery.

Structure of the Central Gray Nuclei.—The cerebellar olive and its accessory nuclei, *i. e.*, nucleus globosus and nucleus emboliformis, have the same structure. Three kinds of elements are found in them: numerous myelinated fibers, a large number of cells and terminal arborizations. The cells are of medium size, multipolar and elongated. From their bodies dendrites are given off which arborize in dividing dichotomously and direct themselves externally. The axis cylinders, on the contrary, turn towards the center or hilum of the cerebellar olive, *i. e.*, towards the superior cerebellar peduncle. Between the cells there are numbers of terminal arborizations dividing dichotomously several times.

The cells of the nucleus fastigii, or nucleus of the tegmentum, are, on the contrary, large multipolar vesiculated cells, analogous to the cells of Bechterew's and Deiters' nuclei. The bodies are large, the protoplasmic expansions few and slightly ramified, thick and very long.

III. The Connections of the Cerebellum

The nerve fibers which run through the white substance of the cerebellum belong to various systems. Some of them terminate in the cerebellum: these are the afferent fibers; others originate in the cerebellum and terminate either within or without it: these are the efferent fibers; or in another territory of the cerebellum at a point more or less remote from that of their origin, on the same side or on the opposite side; these are the fibers of projection or the fibers of association.

The connections of the cerebellum with the other centers are made by means of three large bundles, or peduncles: the inferior cerebellar peduncle, the middle cerebellar peduncle, and the superior cerebellar peduncle. What is the distribution of the efferent and afferent fibers in these three systems of bundles; what are the

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origins of the afferent fibers, and what is the destination of the efferent fibers? These are the problems which have been solved in a great measure by the study of secondary degenerations following focal lesions in man, and by sections or experimental destructions in animals. The experimental method offers the valuable advantage of being able to change the location and extent of the lesions, and it is by this means that the most precise information concerning the origin and termination of the cerebellar bundles has been acquired.

The results obtained by a study of degenerations agree with those obtained by histological methods, such as the method of Cajal, by impregnation with silver chromate. Employing this method in small mammals this author was able to follow the cerebellar fibers to their origins and their terminations. But the method is insufficient for systems of long fibers. These cannot be traced save by studying secondary degenerations.

I. *Afferent Fibers*

The afferent fibers follow two paths in entering the cerebellum, the inferior and median cerebellar peduncles. The inferior cerebellar peduncle contains fibers of bulbar; medullary and spinal origin; the middle cerebellar peduncle contains fibers of pontine origin. In fact, the spinal cord is but a relay station between the periphery of the sensory paths and the cerebellum, the medulla oblongata, an intermediary between the mid-brain and the cerebellum, and the pons is but a station between the cerebral cortex and the cerebellum. This is what anatomy and a study of secondary degenerations teaches.

The Inferior Cerebellar Peduncle or Restiform Body

This is formed of two parts: the spinal and the medullary. The spinal part is represented by: (*a*) the direct cerebellar tract and some fibers of the posterior cord; (*b*) the tract of Goll and the tract of Burdach. The cerebellum receives besides these a bundle of fibers which does not traverse the inferior cerebellar peduncle; these are the fibers from the tract of Gowers.

Spinal Part.—(*a*) The direct cerebellar tract, first described by Foville, and later by Flechsig, originates in man between the

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first lumbar segment and the twelfth dorsal. This limit is disputed and it is carried higher by Schultze who indicates the tenth dorsal segment, and by Kahler and Pick, who indicate the ninth dorsal segment, whereas, Flechsig lowers it to between the second and third lumbar segment. Long, Rothmann, as well as Barbacci, Pellizzi and Flatau, admit that in the dog the lowest fibers appear in the lumbo-sacral region. In the rabbit the exist-

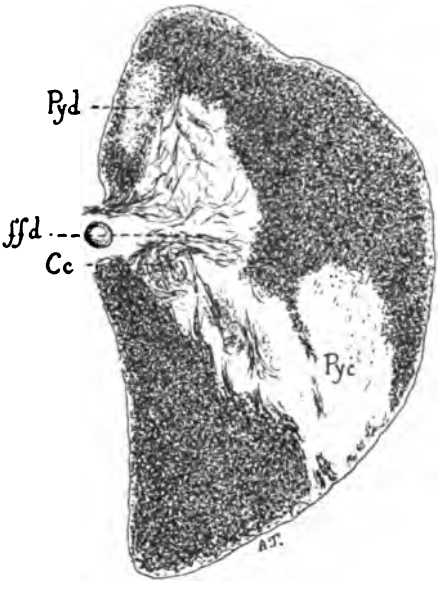

FIG. 6. Section of the spinal cord of a fetus aged 8½ months. Lower dorsal regions. (Stained by the method of Pal.)

The pyramidal tract, crossed and direct, which is not yet myelinated shows in white. The fibers which take their origin in the column of Clarke are directed outwards towards the periphery and constitute the direct cerebellar tract. *Cc,* column of Clarke; *ffd,* fibers coming from the column of Clarke and directed towards the periphery to form the direct cerebellar tract; *Pyc,* crossed pyramidal tract; *Pyd,* direct pyramidal tract.

ence of any such fibers was not found by Singer and Münzer, Sarbo, Münzer and Wiener, and Bochenek. Bing suggests the hypothesis that the direct cerebellar tract commences at a more or less high level in animals according to the greater or less development or absence of the tail. Whatever the explanation may be

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it is possible that variations exist according to the species of animals. The direct cerebellar tract occupies the most posterior and external part of the lateral cord, limited within by the crossed-pyramidal tract, and without by the sub-meningeal tissue, the more posterior fibers adjoin the extremity of the posterior horn; the most anterior fibers enter almost into contact with the posterior fibers of Gowers' tract. It increases in volume progressively as one examines it at the higher levels of the dorsal cord; it does not increase perceptibly above the first dorsal segment and keeps the same volume until it reaches the medulla. It originates in the column of Clarke of the same side; this in its turn extends from the first lumbar root to the first dorsal root.

The origin of the direct cerebellar tract in the column of Clarke is demonstrated: (1) by histological methods, especially by the method of Cajal, where one can see the nerve fibers coming from the column of Clarke traverse the lateral tract and

FIGS. 7 to 11. Degenerations of the direct cerebellar tract and the tract of Gowers after experimental section of the spinal cord in the superior cervical region of the cat.

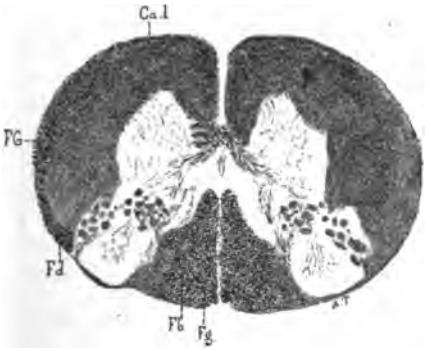

FIG. 7. Section of the spinal cord at the level of the first cervical root. *Cal*, anterior-lateral segment; *Fb*, tract of Burdach; *Fd*, direct cerebellar tract; *FG*, tract of Gowers; *Fg*, tract of Goll.

engage in the direct cerebellar tract; (2) by pathological anatomy. When this tract is severed by a transverse section, or is primarily degenerated in consequence of an hereditary disease, the cells of the column of Clarke atrophy in the planes adjacent to the lesion. In the case of unilateral lesions this atrophy occurs

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only on the same side, which proves that the fibers of the direct cerebellar tract do not cross in the cord, and so come homolaterally from Clarke's column. At the level of the medulla, the direct cerebellar tract bends backwards and penetrates the restiform body or inferior cerebellar peduncle, in which it occupies the central part, and then ascends into the cerebellum and terminates in the anterior portion of the cortex of the superior vermis (Auerbach, Bechterew, Patrick, Thomas, Pellizzi, Bruce, Lewandowsky, Bing).

The fibers terminate some on the same side and others on the opposite side after decussation (Figs. 7 to 10). The proportion of the direct fibers to the crossed fibers is disputed. Pellizzi

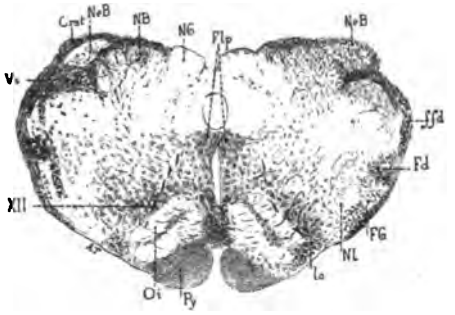

FIG. 8. Section of the medulla at the level of the olives and the external segment of the nucleus of Burdach.

Crst, restiform body; *Fd,* direct cerebellar tract; *ffd,* fibers of the direct cerebellar tract, turning around the descending root of the fifth pair to enter the restiform body; *FG,* tract of Gowers; *Flp,* posterior longitudinal fasciculus; *lo,* latero-olivary ascending tract; *NB,* nucleus of Burdach; *NeB,* external nucleus of the tract of Burdach; *NG,* nucleus of the tract of Goll; *Nl,* nucleus of the lateral tract; *Oi,* inferior olive; *Py,* pyramid; *Vs,* descending root of the fifth pair; *XII,* hypoglossal nerve.

considers the decussation total, Mott says there is a partial decussation. André-Thomas and Edinger consider that there is a decussation of the majority of the fibers, whereas, v. Monakow states that all of the fibers are direct. It seems established, however, that the majority of the fibers decussate and this opinion is also maintained by Bing.

It is known on the other hand that the cells of Clarke's column are plunged in a network of nerve fibers, nourished by the fibers

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of medium length from the posterior roots. The inferior extremity of Clarke's column, according to the experiments of Mott and Marguliès on the monkey receives fibers from the lumbar and sacral roots, whereas, according to Nageotte, the posterior roots below the third lumbar do not furnish any fibers to Clarke's columns. If this last fact were definitely shown it would have a certain physiological importance since the first lumbar roots innervate only the proximal portion of the lower limb, and certain authors hold that the cerebellum exercises a much more active influence over the proximal than over the distal extremity of the leg.

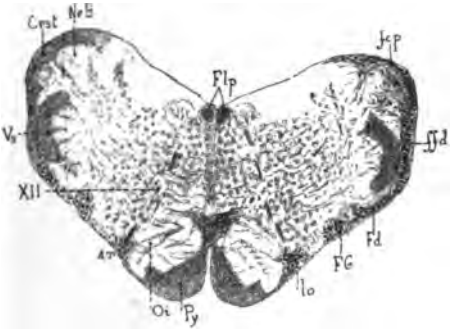

FIG. 9. Section of the medulla at the level of the olives and the restiform body.

Crst, restiform body; *fcp,* fibers of the posterior column going to the restiform body (external posterior arcuate fibers); *Fd, ffd,* direct cerebellar tract; *Fg,* tract of Gowers; *Flp,* posterior longitudinal fasciculus; *lo,* latero-olivary ascending tract; *NeB,* external nucleus of the tract of Burdach; *Oi,* inferior olives; *Py,* pyramid; *Vs,* descending root of the fifth nerve: *XII,* hypoglossal nerve.

The cells of Clarke's columns are in relation principally with the posterior roots of the dorsal region. The posterior cervical roots do not send any fibers to the column of Clarke. Consequently, the direct cerebellar tract does not transmit any peripheral excitation from the arms. The excitations from this origin without doubt follow another path. From what has preceded we may conclude that if the physiological conduction follows the same route as the Wallerian degeneration the direct cerebellar tract transmits to the cerebellum excitations or impressions which come from the periphery, and especially from that territory in-

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nervated by the twelve posterior dorsal roots and the first lumbar. That is to say, excitations which come from the trunk and the proximal portion of the legs. The direct cerebellar tract is not considered as a path of transmission of conscious or sensory impressions, whether superficial or deep. It is generally considered as transmitting stimuli coming from the deep tissues, bones, muscles, articulations, and not from the cutaneous surfaces.

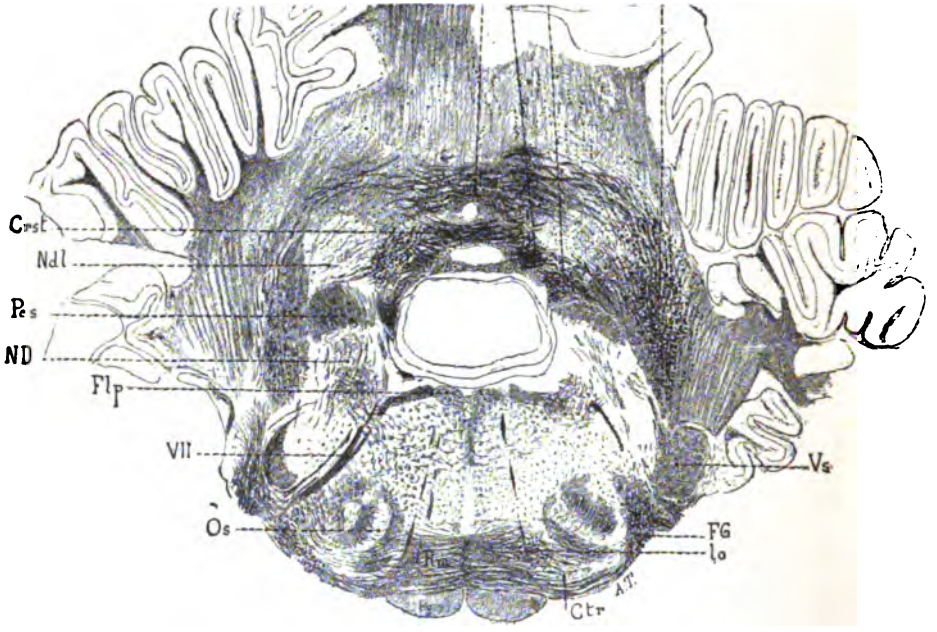

FIG. 10. Section of the medulla below the emergence of the fifth nerve and of the cerebellum at the level of the spreading out of the degenerated fibers of the restiform body. For the indications see the two previous cuts.

Ctr, trapezoid body; *ND*, nucleus of Deiters; *Ndl*, dentate nucleus; *Osoa*, superior olive and accessory olivary nucleus; *Pcs*, superior cerebellar peduncle; *Rm*, median fillet of Reil; *Ve*, vermis; *Vs*, descending root of the fifth; *VII*, facial nerve.

(*b*) *Gowers' Tract* (Figs. 7 to 12).—Gowers' tract is situated in the lateral cord immediately in front of the direct cerebellar tract, and on the border of the circumference; it is a marginal

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tract; it has the form of a triangle, the summit of which is directed towards the lateral horn of the gray substance and the base towards the periphery of the cord.

Some fibers originate in the lumbar regions, but most of them come from the dorsal regions (Mott). The existence of fibers originating in the cervical region has not been shown. The origins of this tract are both direct and crossed. This, according to Edinger, proves that the cells occupy the posterior horn, for Mott the lateral horn, for Gombault and Philippe the cells of the anterior horn, and for Bechterew the cells which surround the central region of the gray matter. According to André-Thomas and J. Ch. Roux, the cells of origin would be situated at the base of the anterior horn.

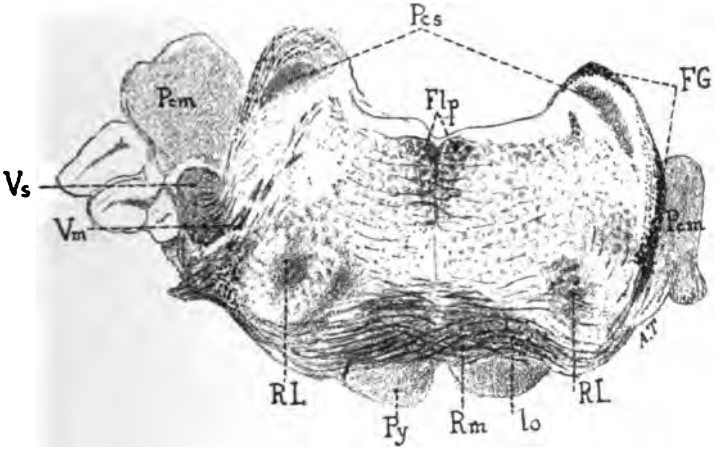

FIG. 11. Section of the medulla above the emergence of the fifth nerve prepared to show the course of Gowers' tract.

FG, tract of Gowers; *Pcm*, middle cerebellar peduncle; *Pcs*, superior cerebellar peduncle; *Rl*, lateral fillet of Reil; *Rm*, median fillet of Reil; *Ds*, descending root of the fifth; *Vm*, small motor root of the fifth.

At the level of the medulla the fibers of Gowers' tract pass immediately outside the nucleus of the lateral tract of the cord, within which they partly lose themselves (André-Thomas), the rest of the fibers follow an ascending path in the pons, winding about the superior cerebellar peduncle at its emergence from the cerebellum, and terminate in the ventral portion of the vermis, or

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the anterior vermis (Mott, Tooth, Pellizzi, Hoche, and André-Thomas). After a decussation almost total, a very small portion terminates in the nucleus fastigii (Auerbach, André-Thomas).

The cells of origin of Gowers' tract enter into relation without doubt with the terminal arborizations of a certain number of the fibers of the posterior roots, and this tract, doubtless, does nothing but transmit stimuli from the periphery.

To sum up, the two tracts which establish relations between the spinal cord and the cerebellum, both end in the vermis and do not furnish any fibers to the hemispheres.

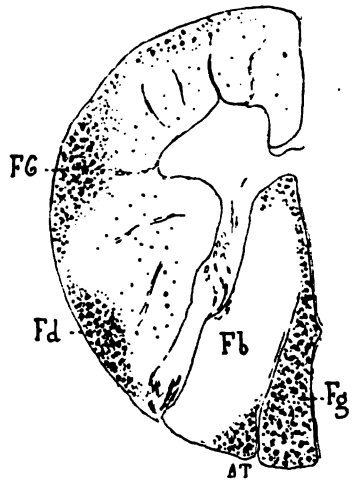

FIG. 12. Degeneration of the posterior column of the direct cerebellar tract and of Gowers' tract in a case of compression of the spinal cord at the third dorsal root (method of Marchi). Level of the eighth cervical root.

Fb, tract of Burdach; *Fd,* direct cerebellar tract; *FG,* tract of Gowers; *Fg,* tract of Goll.

(*c*) *Fibers of the Posterior Cord.*—Their existence is doubted by Flechsig; they are admitted, on the other hand, by Edinger, Darkschewitsch, Freud, Obersteiner, Pellizzi and André-Thomas (Fig. 9). These fibers are direct and perhaps crossed (Edinger, Obersteiner, Mott and Sherrington, and Tooth). They are far less numerous than the fibers of the direct cerebellar tract. They leave the tracts of Goll and Burdach at the level of the

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medulla, and direct themselves toward the restiform body in which they occupy the central part, intimately intermingled with the fibers of the direct cerebellar tract.

Medullary Part. (*a*) *Fibers of the Nuclei of the Posterior Columns.*—Their existence is disputed, denied by Flechsig, Edinger, Obersteiner and Van Gehuchten, and admitted by Bechterew, Darkschewitsch and Freud, Ferrier and Turner, and Vegas. They would take their origin in the nuclei of Goll and Burdach, that is to say, in the nuclei which receive the long fibers of the posterior root.

If the participation of the nucleus of Goll, and the nucleus of Burdach, in the formation of the restiform body appears debatable this is not the case with the superior, external part of the nucleus of Burdach, also called the nucleus of v. Monakow, or the nucleus of the restiform body. This nucleus is distinguished by its large cells richly provided with protoplasmic prolongations, from the cells of the nuclei of Goll and Burdach, which are far smaller. Darkschewitsch and Freud, Vegas and Blumenau were the first to insist upon the relations of this nucleus to the restiform body. Unilateral destructions of the cerebellum are followed by the atrophy and disappearance of the cells of the nucleus of v. Monakow, on the same side. This fact is shown in animals by experimental physiology, and in man by pathological anatomy (André-Thomas). These fibers are, consequently, direct fibers, going from the medulla to the cerebellum on the same side, but it is impossible to say whether they are distributed, either exclusively or preferentially to the vermis, or to the lateral lobe.

The nucleus of v. Monakow also receives fibers from the tract of Burdach; fibers which are nothing but a continuation of the posterior cervical and superior dorsal roots. One is led, therefore, to consider this nucleus as an important relay station between the peripheral excitations which come from the arm, from the neck, and from the superior part of the trunk, on the one side, and the cerebellar cortex on the other. It is probable that the nucleus of v. Monakow plays the same part in relation to the posterior cervical roots that the column of Clarke does in relation to the dorsal and superior lumbar roots.

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(*b*) *Fibers of the Nucleus of the Lateral Columns of the Medulla.*—These fibers have been described by Bechterew, v. Monakow and André-Thomas. The nucleus of the lateral column atrophies after a unilateral destruction of the cerebellum and on the same side as the lesion. These fibers are therefore direct. The place of their termination, vermis or hemisphere, is still undecided. The nucleus of the lateral column receives besides some fibers of the tract of Gowers, and may be looked upon as a new relay station between the spinal cord and the cerebellum.

(*c*) *Olivary Part.*—This is the most important of the medullary cerebellar parts, particularly in man, where the olives attain their maximum development. The destruction of a cerebellar hemisphere is accompanied by a retrograde atrophy, direct, of the restiform body, and crossed, of the inferior olive. These cells atrophy and disappear (Meynert). This is a constant fact (Fig. 13).

The fibers which take their origin in the medullary olive and in the accessory olivary nuclei antero-internal, and postero-external, decussate in the median raphé with those of the opposite side and follow, before penetrating the restiform body, either the periphery of the medulla, after having turned around the pyramid (zonal cerebellar olivary fibers of Mingazzini), or the superior external segment of the internal arcuate fibers (retro- and intertrigeminal fibers of Mingazzini). These fibers are so called because they traverse, or limit behind, the descending root of the fifth nerve.

The olivary fibers occupy the periphery of the restiform body, whereas the center is formed by the direct cerebellar tract, and the fibers of the posterior columns. After section of the restiform body in the dog, degeneration of the fibers can be followed to the cortex of the superior vermis, principally of the same side, as well as to the hemispheric cortex in continuation with the lamellæ of the vermis (André-Thomas, Klimoff, Keller and Probst). Similar observations have been made by Mott, but it has been impossible in these experiments to trace the olivary fibers.

In the higher monkeys and above all in man, the medullary olive takes on a considerable development; it doubles on itself several times, and it is the same thing in the case of the cere-

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bellar olive. There exists a certain parallelism in the development of these two formations. In man the degenerations of the olivary fibers have been followed to the nucleus dentatus, and the nucleus emboliformis by Babinski, Nageotte, and André-Thomas. Babinski and Nageotte give the names olivo-ciliary to these fibers.

FIGS. 13 to 16. Transverse sections of the medulla, the pons and the thalamic region in a case of softening of the left hemisphere of the cerebellum. Weigert-Pal staining.

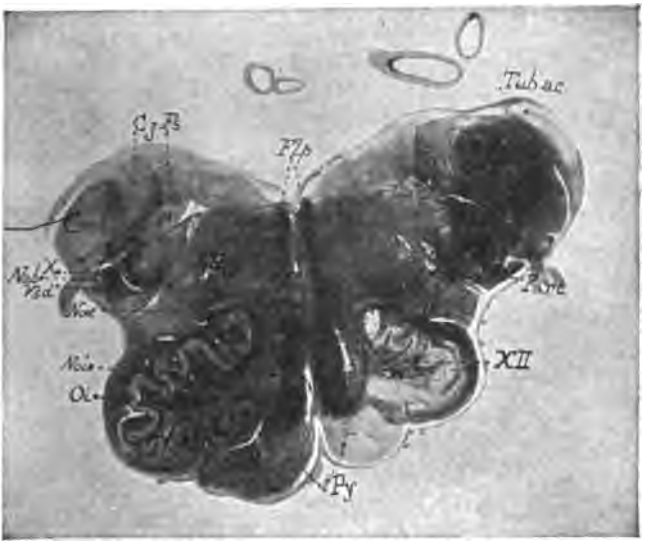

FIG. 13. Section of the medulla. Crossed atrophy of the olive. Direct atrophy of the restiform body. In this case the pyramid is equally atrophied in consequence of a lesion situated in the peduncular path.

Cj, juxta-restiform body; *Crst*, restiform body; *Farc*, arcuate fibers; *Flp*, posterior longitudinal fasciculus; *Fs*, solitary bundle; *Nab*, nucleus ambiguus; *Noe*, postero-external accessory olivary nucleus; *Noi*, antero-internal accessory-olivary nucleus; *O*, inferior olive; *Py*, pyramid; *SRg*, reticulated gray substance; *SRa*, reticulated white substance; *Tub, ac*, acoustic tubercle; *X*, pneumogastric nerve; *XII*, hypoglossal nerve; *Vsd*, descending root of fifth nerve.

The olivary fibers, consequently, have a double destination, viz., the cerebellar cortex, and the central gray nuclei (nucleus dentatus and emboliformis).

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Holmes and Stewart have attempted utilizing the method of secondary degenerations in man, to define the relations of the olive to the cerebellar cortex. They have obtained the following results: (1) each olive is in connection with the contra-lateral half of the cerebellum; (2) the olivo-cerebellar fibers terminate in the lateral lobes, and probably also in the vermis. The fibers going to the central gray nuclei are certainly very few; there exists according to the same authors a definite relation between the different parts of the inferior olives and the accessory olivary nuclei on the one side, and the different zones of the cerebellar cortex on the other.

(*a*) The lateral portion of the olives are in connection with the lateral portion of the cerebellar cortex on the opposite side. (*b*) The median extremities of the inferior olives and the antero-internal accessory olivary nuclei sends fibers probably to the vermis and the median portion of the lateral lobes. (*c*) The dorsal fold of the olive is particularly in relation with the superior face of the cerebellum. (*d*) The ventral fold is rather in relation with the inferior face.

The medullary olives receive the terminal arborizations of the central bundle of the tegmentum; they do not receive any other fibers from the cortex. The central bundle of the tegmentum is formed by fibers which take their origin in the reticulated substance of the tegmentum at the level of the medulla, from the pons and from the sub-optic region. The medullary olive unites thus the mesencephalon and the rhombencephalon of the same side to the cortex, and to the cerebellar olive of the opposite side.

The Middle Cerebellar Peduncle

(Fig. 14)

The middle cerebellar peduncle is a large bundle of transverse fibers interposed between the anterior surface of the pons and the cerebellum. The middle cerebellar peduncle attains its maximum development in the higher apes and in man, and the degree of its development is proportional to that of the pons and the pyramidal tract on the one hand, and the lateral lobe of the cerebellum, including the dentate nucleus on the other.

The study of secondary degenerations and of retrograde atro-

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phies has shown that the fibers of the middle cerebellar peduncle are nothing but the prolongations of the axis cylinders of the cells of the pontine nuclei of the opposite side. Nevertheless, some fibers come from the most external part of the homolateral pontine nuclei (André-Thomas). Besides, some fibers take their origin from the gray substance of the pontine tegmentum. Is

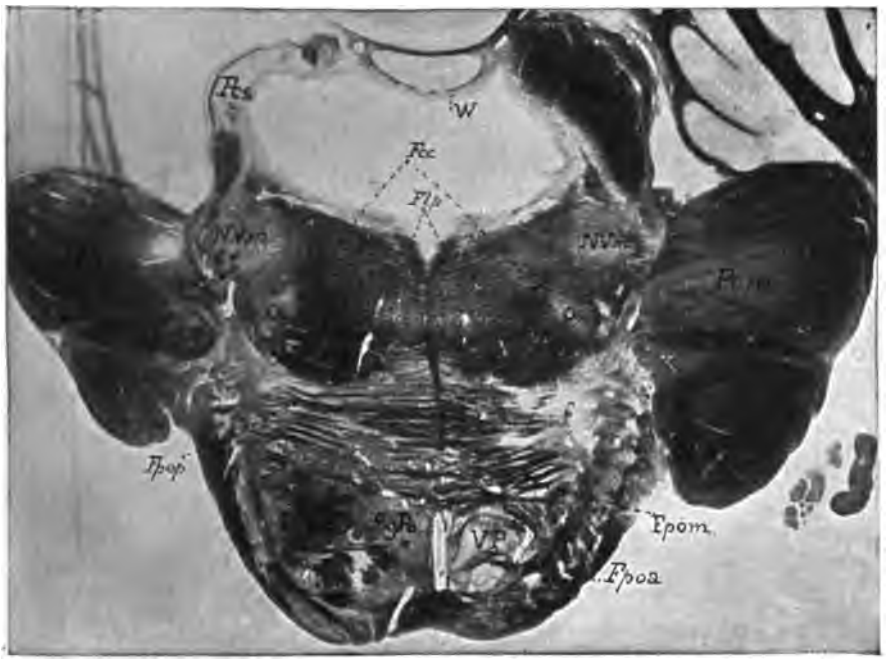

FIG. 14. Transverse section of the pons. To the right, degeneration of the superior cerebellar peduncle (*Psc*), atrophy of the middle cerebellar peduncle (*Pcm*); to the left, atrophy of the central bundle of the tegmentum (*Fcc*).

Fpoa, Fpom, Fpop, anterior, middle and posterior transverse bundles of the middle cerebellar peduncle; *NVm,* motor nucleus of the fifth; *Os,* superior olive; *SgPo,* gray substance of the pons; *VP,* peduncular tract; *W,* valve of Vieussens; *f,* small focus of softening.

it possible that some fibers have an inverse direction? That is to say, do they go from the cerebellar cortex to the gray substance of the pons? The middle cerebellar peduncle does not contain any commissural fibers between the two hemispheres.

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It is also established that the fibers of this peduncle terminate exclusively in the cerebellar cortex; none of them go to the central ganglia. All these fibers are destined for the lateral lobe; it has not been shown that the vermis receives any.

The arciform or pre-pyramidal nucleus which is attached to the anterior border of the medullary pyramid also atrophies

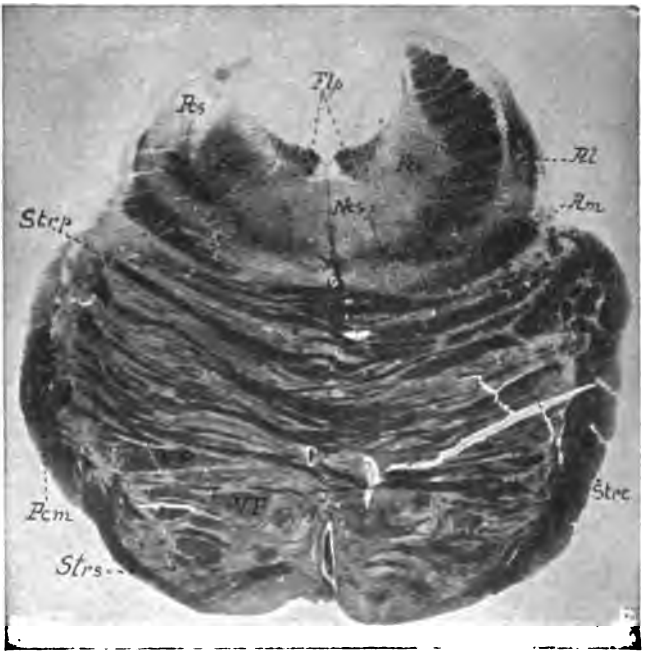

FIG. 15. Transverse section of the pons (superior extremity). Degeneration of the right superior cerebellar peduncle (*Pcs*). Atrophy of the central bundle of the tegmentum (*Fcc*) to the left.

Ncs, central superior nucleus; *Rl*, lateral fillet of Reil; *Rm*, median fillet of Reil; *Strp*, *Stns*, *Stnc*, stratum profundum superficiale and centrale of the middle cerebellar peduncle (*Pcm*). For other indications see the preceding cuts.

after unilateral destruction of the cerebellum, and this atrophy is crossed. The fibers which leave it accompany the olivary fibers to reach the cerebellum, passing through the restiform body, or they may follow the middle cerebellar peduncle. The arciform

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nucleus is perhaps nothing but the inferior extremity of the pontine nucleus, of which the lowest groups of cells are lodged in front of the pyramids.

The relations of the cerebral cortex with the gray substance of the pons have been established by secondary degenerations,

FIG. 16. Vertico-transverse section of the encephalic isthmus at the level of the posterior part of the optic thalamus and the red nucleus. The cut should be reversed and represents the left side. Atrophy of the red nucleus (*NR*) and radiations from the tegmentum (*RC*).

CL, body of Luys; *Fm*, bundle of Meynert; *Thnm*, median nucleus of the thalamus; *Ihne*, external nucleus of the thalamus; *II*, optic tract.

consecutive to focal lesions in the cerebral cortex, or, of its fibers of projection in the internal capsule and the cerebral peduncle.

A large number of the fibers of the cerebral peduncle, or

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crus-cerebri, of which the origin is exclusively cortical, lose themselves in the anterior surface of the pons. This fact is already sufficiently proven by the difference in volume which exists in the normal state between the number of fibers contained in the crus, and the number contained in the pyramid, and still more by the large number of granular bodies which occupy the pontine nucleus in the case of secondary degeneration of the crus. These cortico-pontine fibers all stay on the same side of the pons.

The relations of the gray substance of the pons and that of the cerebellum are, on the contrary, crossed; the result is that each pontine nucleus is an intercalated post between the cerebral cortex of the same side and the cerebellar cortex of the opposite side.

What are the territories of the cerebral cortex which are in connection with the cerebellar cortex through the intermediation of the pontine nuclei? They are those which furnish fibers to the crus-cerebri, and, consequently, primarily the sensori-motor zone—the frontal ascending, parietal lobes, and the paracentral lobules. The external tract of the crus, or the bundle of Türck, terminates exclusively in the superior third of the anterior surface of the pons. It takes its origin from the middle segment of the second and third temporal convolutions (M. and Mme. Déjerine). Finally, some fibers follow the internal bundle of the crus, and come from the orbital lobe (Déjerine and André-Thomas).

There should result from these anatomical relations a functional association of considerable importance between the cerebellar cortex and the cerebral cortex, an association capable of throwing light, in a certain measure, upon the physiological mechanisms of the cerebellum; especially if one reflects upon the fact that the cortical zones of the cerebrum, which are projected anatomically and physiologically upon the cerebellar cortex, are sensory-motor zones, and a zone (second and third temporal convolutions) which many authors consider as the center of impressions of labyrinthine origin.

To sum up, and to close the chapter of the afferent paths, whereas, the inferior cerebellar peduncle or restiform body brings into relation the cortex of the vermis, and the adjacent parts of the cerebellar hemispheres, with the spinal cord, the medulla and

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the mid-brain, the middle cerebellar peduncle serves as a tie between the cerebral cortex and the cortex of the cerebellar hemispheres. The comparative examination of the neuro-axis in the animal series shows that there is a constant parallelism between the development of the pons and the median cerebellar peduncles and the cerebral cortex.

II. *Efferent Fibers*

In the same way that the afferent fibers follow the path of the inferior cerebellar peduncle and the median cerebellar peduncle to penetrate the cerebellum, the efferent fibers for the most part pass through the superior cerebellar peduncle; some come out of the cerebellum through the internal segment of the restiform body or the juxta-restiform body. A very small number follow the inferior cerebellar peduncle.

The Superior Cerebellar Peduncle

The superior cerebellar peduncle is a large bundle which goes from one cerebellar hemisphere to the red nucleus and to the optic thalamus of the opposite side (Figs. 15 to 20). It has been by a study of secondary degenerations in animals that the origins of this bundle have been defined. It was admitted in the first place that it came from the red nucleus (Mahaim and M. and Mme. Déjerine). The experiments of Marchi, Ferrier and Turner, Russell and André-Thomas, have shown definitely that it comes from the cerebellum, not from the cerebellar cortex but from the rhomboid body or the dentate nucleus.

The fibers of the superior cerebellar peduncle decussate in the pontine tegmentum, decussation of Wernekink, with those of the contra-lateral peduncle; the decussation is complete.

After its decussation the superior cerebellar peduncle divides into two branches, ascending and descending (Ramon y Cajal, André-Thomas).

The ascending branch, by far the most important, follows an ascending path and traverses the red nucleus, to which it gives a certain number of fibers, before terminating in the optic thalamus (principally the ventral portion of the external nucleus, Figs. 19 and 20). It is possible that the red nucleus furnishes

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some descending fibers to the superior cerebellar peduncle, in any case these fibers would be few.

The descending branch, much more slender, terminates in the nucleus reticularis tegmenti pontis (André-Thomas, Fig. 17).

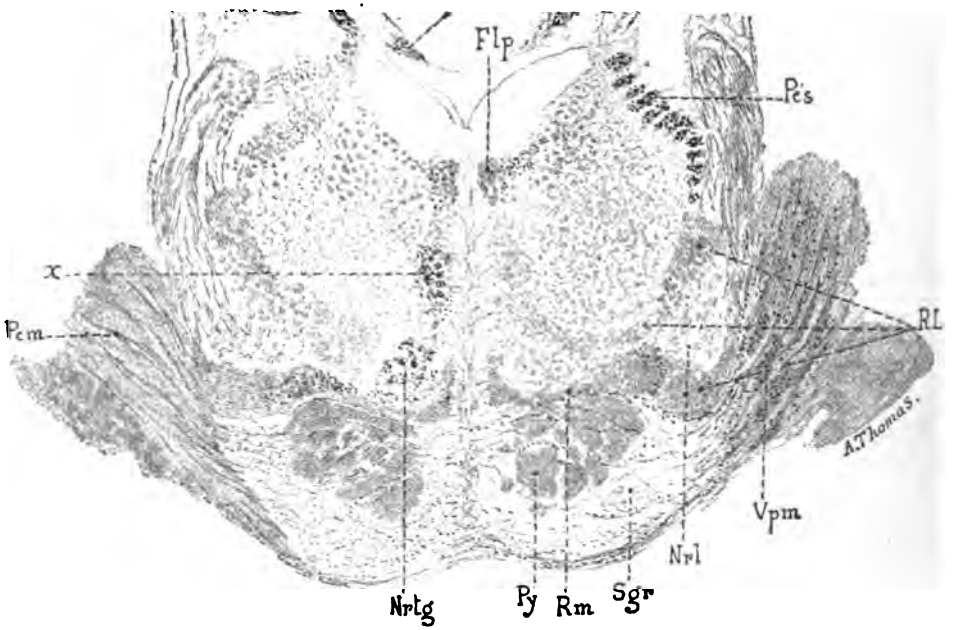

FIG. 17. Section at the level of the superior third of the pons. Degeneration of the superior and middle cerebellar peduncles after the destruction of the left half of the cerebellum in the dog. Termination of the superior branch of the superior cerebellar peduncle in the nucleus reticularis tegmenti pontis.

Flp, posterior longitudinal fasciculus; *Nrl*, nucleus of the lateral fillet of Reil; *Nrtg*, nucleus reticularis tegmenti pontis; *Pcm*, middle cerebellar peduncle; *Pcs*, superior cerebellar peduncle; *Py*, pyramid; *RL*, lateral fillet of Reil; *Rm*, median fillet of Reil; *Sgr*, gray substance of the pons; *X*, zone of degeneration in the median reticulated substance independent of the cerebellar lesion; *IV*, nervous patheticus; *Vpm*, small motor root of fifth nerve.

The nerve current transmitted to the optic thalamus by the superior cerebellar peduncle ends finally in the cerebral cortex through the intermediary of the thalamo-cortical fibers. On the other hand the fibers which go to the red nucleus form an arbori-

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zation around cells the axis cylinders of which go to the spinal cord after a decussation in the pontine tegmentum (v. Monakow, Rothmann, Probst and Pawlow), and form v. Monakow's bundle, or the rubro-spinal tract of Van Gehuchten. This tract has not been followed up to now except in animals, particularly in the macaque, it is situated in the lateral column immediately in front of the pyramidal bundle (pre-pyramidal bundle of André-Thomas). Its existence has not been demonstrated in man.

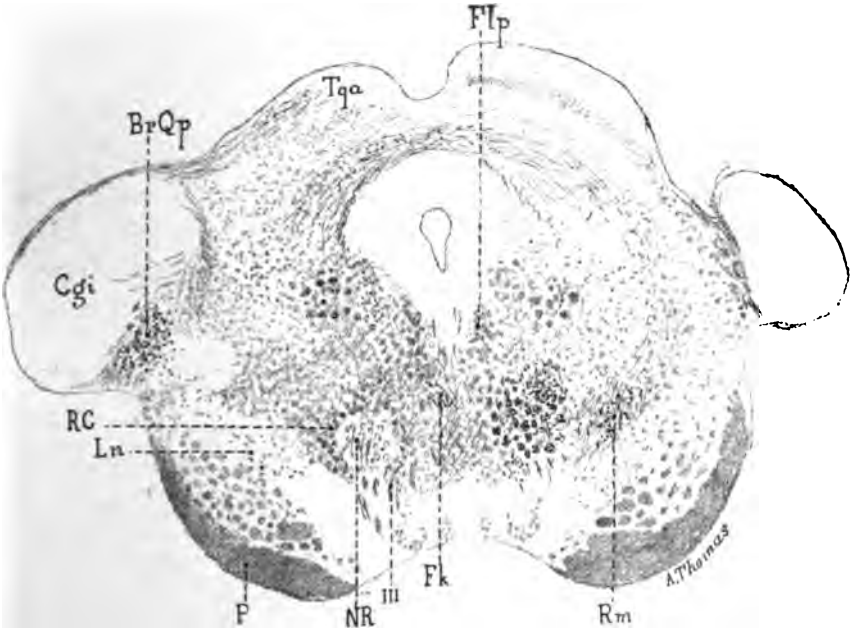

FIG. 18. The cut has by mistake been reversed. The right side should be the left and vice-versa. The same mistake has been made in the following cuts. Degeneration of the red nucleus.

BrQp, brachium of the posterior quadrigeminate body; *Cgi*, internal geniculate body; *Flp*, posterior longitudinal fasciculus; *Fk*, fontainartige Hauben Kreuzung; *Ln*, locus niger; *NR*, red nucleus; *P*, peduncle; *RC*, capsule of the red nucleus and radiations of the tegmentum; *Rm*, median fillet of Reil; *Tga*, anterior quadrigeminal tubercle; *III*, nervus motor ocularis communis.

The superior cerebellar peduncle thus establishes fairly direct relations between the cerebellum on one hand and the cerebrum and spinal cord on the other.

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In a recent work v. Monakow has made a study of the red nucleus in mammals and in man, and from his researches he concludes that this nucleus is made up of two secondary nuclei.

The one with large disseminated cells in the dorso-lateral part of the pontine tegmentum forms a reticulated nucleus (*nucleus magnocellularis* of Hatschek). The other accompanies the bundles which traverse the red nucleus but occupies mostly the frontal extremity and is formed of small cells (*nucleus parvocellularis* of Hatschek). The first is phylogenetically the oldest and is more important in quadrupeds, in anthropoids and in man the nucleus parvocellularis takes on the greater development.

The nucleus magnocelluris which gives rise to the rubrospinal bundle is very voluminous in lower mammals, and is rudimentary in man. The fibers which arise from the nucleus parvocellularis rise immediately after decussation in the pontine tegmentum in the neighborhood of the fillet, and in the dorsal portion of the tegmentum. The nucleus parvocellularis it seems has also some important relations with the frontal lobe (as has been established by M. and Mme. Déjerine). The structure and connections of the red nucleus become complicated in direct proportion to the development of the frontal lobes and the cerebellar hemispheres.

The Internal Segment of the Restiform Body or Juxta-restiform Body. The Cerebello-vestibular Bundle.

The cerebellum has such important relations with the nuclei of the vestibular nerve and the internal segment of the restiform body that many authors have described phenomena of degeneration which follow sections of the vestibular nerves analogous to those which follow the destruction of the cerebellum.

The root of the eighth nerve is divided into two branches, the cochlear and the vestibular.

The fibers of the vestibular branch terminate in three medullary nuclei. The nucleus of Deiters, the nucleus of Bechterew, and the triangular nucleus. Some fibers are distributed in the nucleus of the tegmentum (André-Thomas).

The nucleus of Deiters occupies the angle in the pontine tegmentum formed by the descending root of the fifth nerve and the restiform body, or the inferior cerebellar peduncle. It is a

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nucleus composed of large cells; it is continuous above and behind on the side of the cerebellum with the nucleus of Bechterew, situated on the border of the fourth ventricle; below with a column

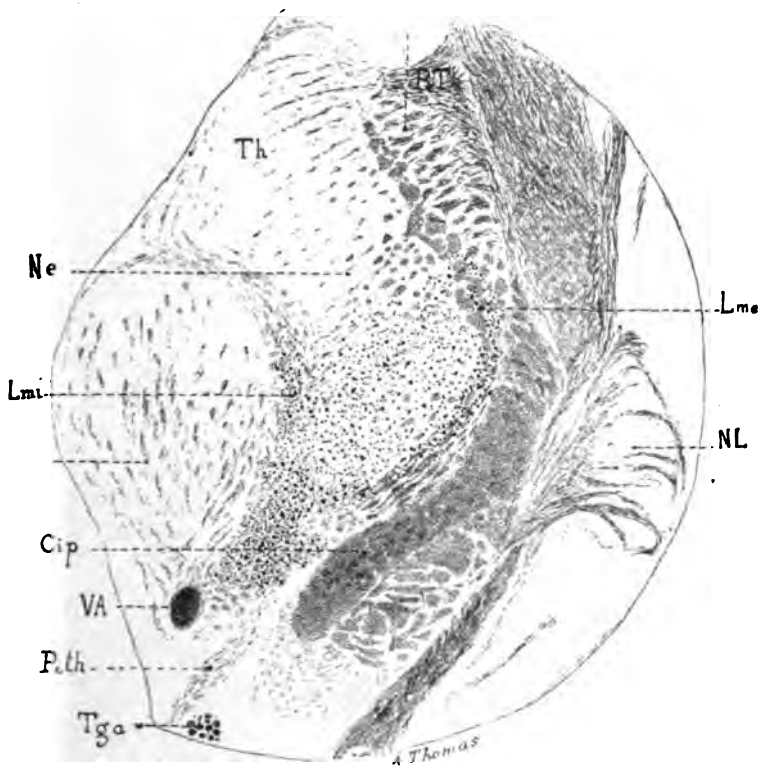

FIG. 19. Vertico-transverse section at the level of the middle third of the optic thalamus. Radiations of the superior cerebellar peduncle in the thalamus. (Same case as in Figs. 17 to 27.)

Cip, posterior internal capsule; *Lme*, external medullary fold; *Lmi*, internal medullary fold; *Ne*, external thalamic nucleus; *Ni*, internal thalamic nucleus; *NL*, lenticular nucleus; *Pith*, inferior peduncle of thalamus; *RTh*, thalamic radiations; *Tga*, anterior pillar of the trigone; *VA*, band of Vicq d'Azyr; *Tr*, reticular zone.

of gray substance lying alongside the internal border of the restiform body and which contains a certain number of little bundles which have a vertical direction. These little bundles form the

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internal segment of the restiform body, or better, the juxta-restiform body (old ascending auditory root, or root of Roller).

We have given these bundles the name of cerebello-vestibular bundles because they are composed of two kinds of fibers (Figs. 21 and 22): descending fibers from the vestibular root of the

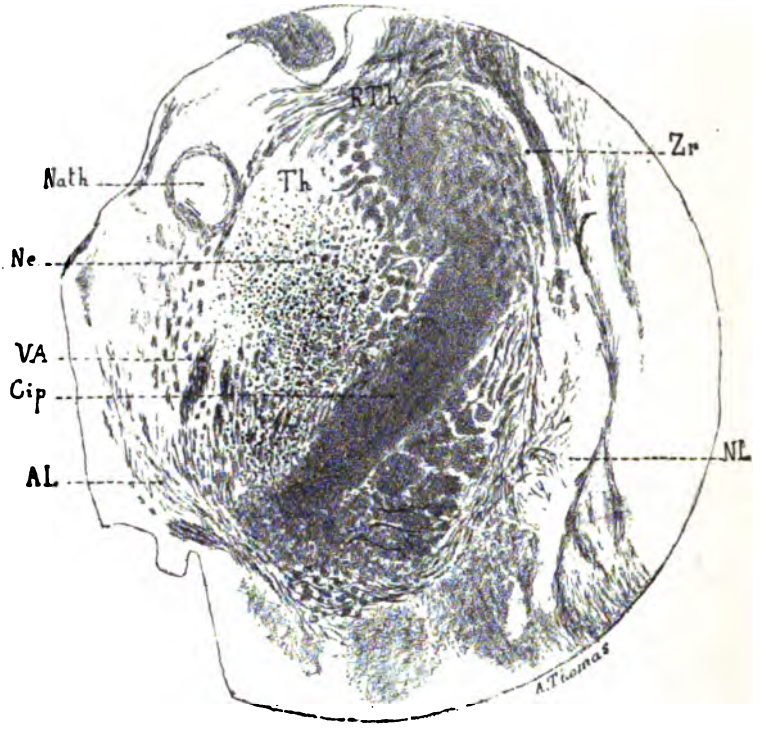

FIG. 20. Vertico-transverse section at the level of the anterior third of the optic thalamus. Ultimate termination of the degenerated fibers of the superior cerebellar peduncle in the thalamus.

AL, loop of the lenticular nucleus; *Nc*, external nucleus of the thalamus; *Cip*, posterior internal capsule; *Nath*, anterior thalamic nucleus; *NL*, lenticular nucleus; *RTh*, thalamic radiations; *VA*, band of Vicq d'Azyr; *Tr*, reticular zone.

eighth pair and fibers coming from the central gray nuclei of the cerebellum. Both of them lose themselves in the column of gray substance which accompanies them and which is a prolongation of the nucleus of Deiters. The existence of these fibers has

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been shown by the method of experimental degeneration after a section of the eighth pair, and after destruction of the lateral half of the cerebellum.

The triangular nucleus is a nucleus composed of small cells applied by its base to the antero-lateral angle of the fourth ventricle.

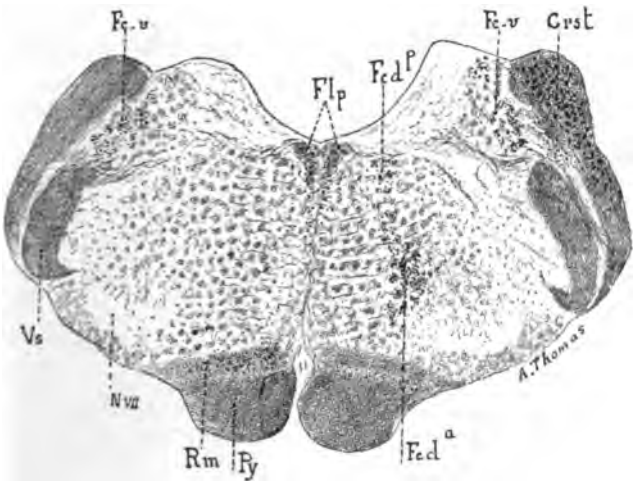

FIG. 21. Section of the medulla below the olives. Degenerations of the descending cerebellar tract, of the restiform body and of the cerebello-vestibular bundles.

Crst, restiform body; *Fcda,* anterior portion of the descending cerebellar tract; *Fcdp,* posterior portion of the descending cerebellar tract; *Fcv,* cerebellar-vestibular tracts; *Flp,* posterior longitudinal fasciculus; *NVII,* facial nucleus; *Py,* pyramid; *Rm,* median fillet of Reil; *Vs,* descending root of fifth nerve.

The cerebellum furnishes also some fibers to the vestibular root, and to the juxta-restiform body. The nucleus of the tegmentum is the principal origin, but it is probable that the globosus and the emboliformis (Koesel), and perhaps even the dentate nucleus, furnish a certain number of fibers; none of them seem to come from the cerebellar cortex.

The whole of the central gray nuclei of each half of the cerebellum thus enters into relation with the two vestibular nerves, with a certain preference for those of the same side. The direct fibers are no other than the internal arcuate fibers which run

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along the lateral border of the fourth ventricle before reaching the nuclei of Deiters and Bechterew, and the external arcuate fibers which traverse the white substance passing outside the dentate nucleus. The crossed fibers pass through the anterior commissure of the cerebellum and the bundle of the uncus (Russell and André-Thomas), which turns around the superior cerebellar peduncle below its emergence from the cerebellum (cerebello-bulbar bundle of Van Gehuchten) (Figs. 23 and 27).

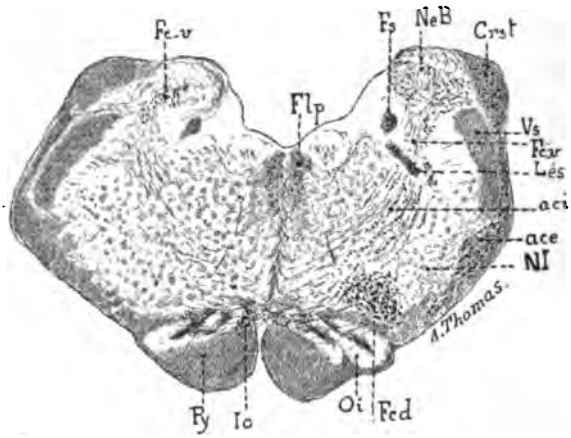

FIG. 22. Section of the medulla passing through the olives and the external nucleus of the column of Burdach. Termination of the degenerated fibers of the restiform body in the nucleus of the lateral column and the external nucleus of the column of Burdach.

Ace, external arcuate fibers; *aci,* internal arcuate fibers; *Crst,* restiform body; *Fcg,* descending cerebellar tract; *Fcv,* cerebellar-vestibular bundles; *Fs,* solitary bundle; *Flp,* posterior longitudinal fasciculus; *Io,* interolivary layer; *Lis,* an accessory lesion, several internal arcuate fibers having been cut; *NeB,* external nucleus of the column of Burdach; *Nl,* nucleus of the lateral column; *Oi,* inferior olive; *Py,* pyramid; *Vs,* descending root of the fifth nerve.

Among the fibers which go to the nucleus of Deiters, or which follow the uncus, there are a certain number which join from above, below and contribute to form the cerebello-vestibular bundles.

To sum up, there are intimate relations between the nuclei of the vestibular nerve and the central gray nuclei of the cerebellum,

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more particularly the nucleus of the tegmentum. Since the nucleus of the tegmentum belongs particularly to the vermis and the dentate nucleus depends more upon the cortex of the lateral lobe, it results that there should exist between the vermis and the vestibular apparatus physiological relations of the greatest importance.

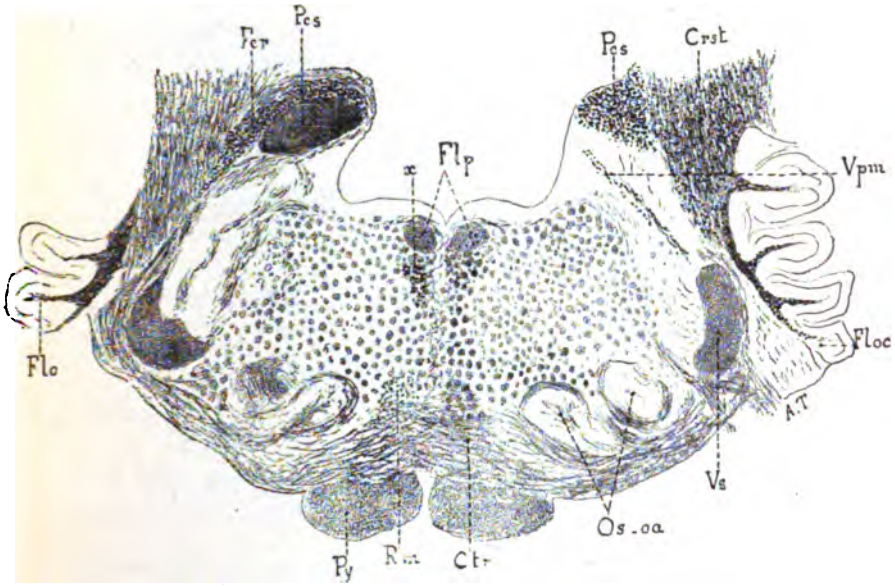

FIG. 23. Section designed to show the degeneration of the superior cerebellar peduncle on the side of the lesion and of the arciform bundle on the opposite side. (The section is not absolutely horizontal, but oblique from above downward and from right to left.)

Crst, restiform body; *Ctr,* trapezoid body; *Fcr,* unciform bundle; *Floc,* flocculus; *Flp,* posterior longitudinal fasciculus; *Oo–oa,* superior olive and accessory olivary nucleus; *Psc,* superior cerebellar peduncle; *Py,* pyramid; *Rm,* median fillet of Reil; *X,* zone of degeneration in the median reticulate substance; *Vpm,* small motor root of the fifth nerve degenerated in consequence of a lesion of its nucleus of origin; *Vs,* descending root of the fifth nerve.

The Inferior Cerebellar Peduncle or Restiform Body.—The few fibers which degenerate in the restiform body of the same side after the destruction of a cerebellar hemisphere, stop for the most part in the reticular substance of the medulla, particularly

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in the nucleus of the lateral segment and in the nucleus of v. Monakow (external nucleus of the column of Burdach). The inferior cerebellar peduncle, therefore, is composed almost exclusively of afferent fibers.

The Relations of the Cerebellum and the Spinal Cord.—Opinions are very much divided as to the nature of the relations between the cerebellum and the spinal cord.

The central gray nuclei of the cerebellum send fibers to the nuclei of Deiters and Bechterew. The axis cylinder prolonga-

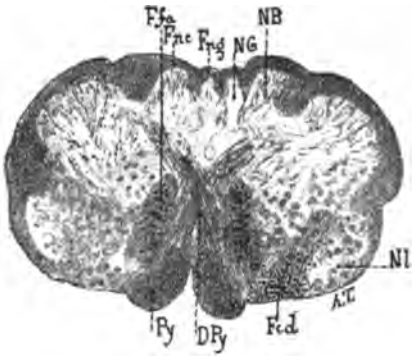

FIG. 24. Section of the medulla passing through the level of the decussation of the pyramids. Degeneration of the descending cerebellar tract.

Dpy, decussation of the pyramids; *Fcd,* descending cerebellar bundle; *Ffa,* anterior fundamental bundle; *Fmc,* funiculus cuneatus; *Fnc,* funiculus gracilis; *NB,* nucleus of the tract of Burdach; *NG,* nucleus of the column of Goll; *Nl,* nucleus of the lateral column; *Py,* pyramid.

tions of the cells of Deiters' nucleus terminate partly in the anterior horns, after having followed the antero-lateral segment of the cord. At the level of the medulla they pass through the reticular substance and the posterior longitudinal fasciculus. These fibers appear to enter more in relation with the antero-internal groups of cells than with the external and posterior nuclei of the anterior horns. They can be followed the whole length of the cord. In addition to these some fibers leave the nuclei of Deiters and of Bechterew and go to the oculo-motor nuclei, more particularly to the nucleus of the sixth pair of the same side and to the nucleus of the third pair of the opposite

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side. These latter follow the contra-lateral posterior longitudinal fasciculus (André-Thomas).

The tonic and coördinating influence of the nuclei of the eighth pair (vestibular), not only over the muscles of the trunk

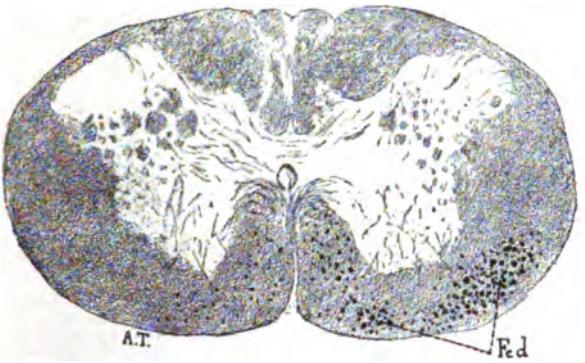

FIG. 25. Section passing through the level of the first cervical root. *Fcd*, descending cerebellar bundle (side of the lesion).

and limbs but also over those of the eyes, is deducible from these simple anatomical observations; since these nuclei receive at the same time vestibular and cerebellar fibers. One may conclude from this that coördinations of the same order may be presided

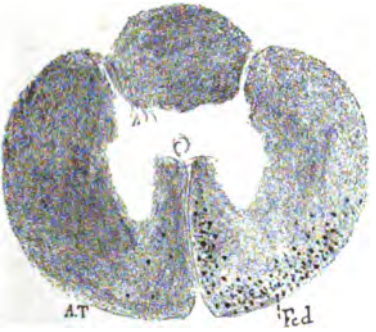

FIG. 26. The descending cerebellar bundle in the mid-dorsal region.

over both by the cerebellum and by the vestibular nerves. Physiological experiments have in fact shown that lesions of one or the other produce analogous but not identical phenomena.

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The existence of indirect relations of the cerebellum with the spinal cord through the intermediation of the nucleus of Deiters is definitely admitted. This is not the case with the direct rela-

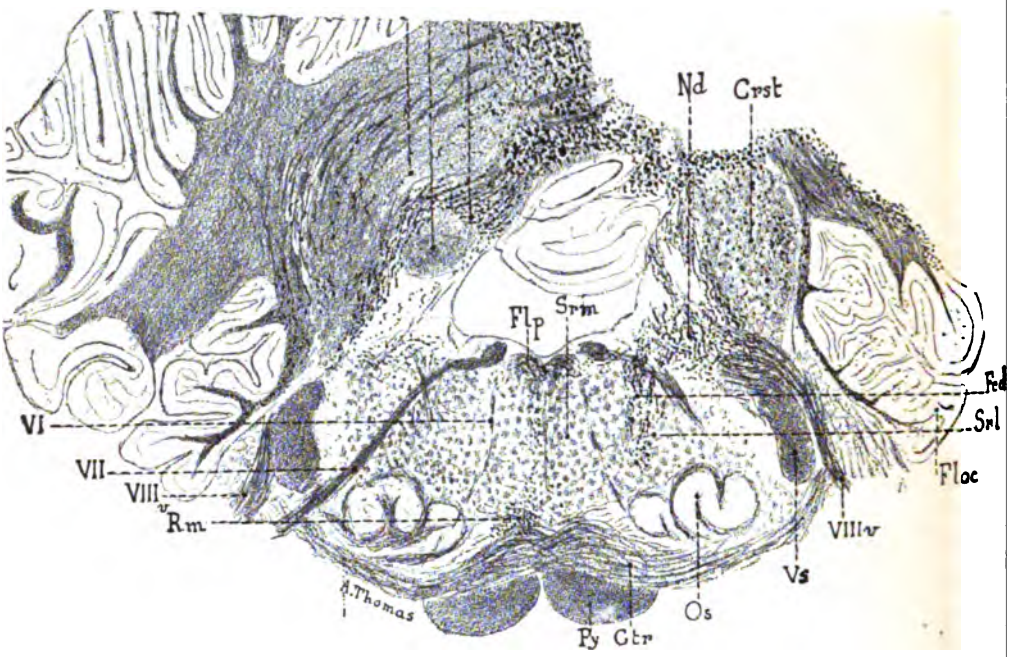

FIG. 27. Section of the medulla passing through the trapezoid body and the superior olives. The descending cerebellar bundle (*Fcd*), after having crossed the nucleus of Dieters, is directed forward in the lateral reticular substance (*Slr*).

Crst, restiform body; *Ctr*, trapezoid body; *Fcd*, descending cerebellar bundle; *Fcr*, unciform bundle; *Floc*, flocculus; *Flp*, posterior longitudinal fasciculus; *Nd*, nucleus of Dieters; *Ndl*, dentate nucleus; *Os*, superior olive; *Pcs*, superior cerebellar peduncle; *Py*, pyramid; *Rm*, median fillet of Reil; *Srl*, lateral reticular substance; *Srm*, Median reticular substance; *Vs*, descending root of the fifth nerve; *VI*, sixth nerve; *VII*, facial nerve; *VIII, v*, vestibular nerve. The nucleus of Bechterew is behind the nucleus of Dieters between the restiform body and the fourth ventricle.

tions. Descending cerebellar fibers are admitted by Marchi, André-Thomas, Orestano and Luna. They originate in the dentate nucleus. The path of this bundle which I have indicated in

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a former work is as follows (Figs. 27 and 28) : Coming out of the dentate nucleus the descending cerebellar bundle crosses the nucleus of Bechterew throughout its whole width. Its fibers then are directed towards the reticular substance of the pons, and pass, some below, some above and some between the fibers of the facial nerve. They then take two directions, the larger

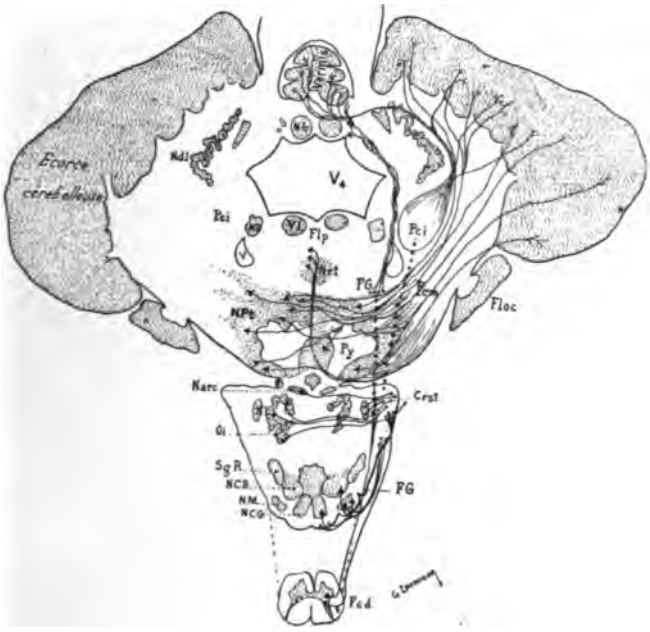

FIG. 28. Afferent fibers of the cerebellum.

number going anteriorly in the lateral part of the reticular substance and mingle with that part of the fibers of the nucleus of Deiters destined for the spinal cord; the others pass posteriorly.

The anterior group, situated at first behind the olive, then behind the nucleus of the facial nerve, occupies the antero-external border of the inferior olive lower down. The posterior group is placed in front of the genu of the facial nerve, and then in front of the triangular nucleus of the vestibular nerve. At the lower level of the medulla, the two groups tend to confound themselves one with another and after decussating form a bundle

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in the antero-lateral segment of the spinal cord. This bundle can be followed as far as the lumbar cord. Besides these, some fibers pass through the bundle of the uncus and internal segment of the restiform body to descend in the anterior ground bundle of the spinal cord of the opposite side. These last fibers do not go below the mid-dorsal region.

The existence of descending cerebellar fibers is denied by Ferrier and Turner, Risien Russell, Van Gehuchten and Kohnstamm. For these authors degeneration of the antero-lateral tract of the cord following a destruction of the cerebellum is not observed unless the nucleus of Deiters has been affected by the lesion. Descending cerebellar fibers have not as yet been observed in man.

III. *Intrinsic Fibers of the Cerebellum. Fibers of Projection and Association. Connections of the Cerebellar Cortex with the Central Gray Nuclei*

In addition to the afferent and efferent fibers there exist intrinsic fibers, that is to say, fibers which have their origin and termination within the cerebellum itself. These fibers are of two orders. Fibers of projection and fibers of association. The fibers of projection unite the cerebellar cortex to the central gray nuclei; the fibers of association unite the lobes, lobules and lamellæ of the cerebellum, one to another.

Fibers of Projection (Fig. 29).—The fibers of projection take their origin for the most part in the cerebellar cortex and terminate in the central gray nuclei; the dentate, globosis, emboliformis and nucleus of the tegmentum. It is also probable that a number of fibers originate in these nuclei and go to the cerebellar cortex. Their existence, however, has not been so definitely shown as that of the first kind.

There is a systematization in the cortico-nuclear relations.

The dentate nucleus receives fibers from the cortex of the lateral lobe (André-Thomas, Clarke and Horsley), and also fibers from the median lobe of the vermis (Clarke and Horsley). The nucleus of the tegmentum receives fibers from the vermis and from the flocculus. According to Clarke and Horsley the nucleus of the tegmentum would receive fibers from the whole of the cerebellar cortex. If this be true it would have an important

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FIG. 29. Efferent fibers and fibers of projection of the cerebellum. (Same legend for both cuts.)

Cip, posterior segment of the internal capsule; *Cisl*, retro-lenticular segment of the internal capsule; *Crst*, restiform body; *fcd*, descending cerebellar bundle; *FG*, tract of Gowers; *Floc*, flocculus; *Flp*, posterior longitudinal bundle; *Ln*, locus niger; *Na*, *Ne*, *Ni*, anterior, external and internal nuclei of the thalamus; *Nanc*, arciform nucleus; *NC*, caudate nucleus; *NCB*, nucleus of the column of Burdach; *NCG*, nucleus of the column of Goll; *ND*, Dieters' nucleus; *Ndl*, dentate nucleus; *Nl*, nucleus of the lateral column; *NL–1*, *Nl–2*, *Nl–3*, first, second and third segments of the lenticular nucleus; *NM*, nucleus of Monakow; *Npt*, pontine nucleus; *NR*, red nucleus; *Nrt*, nucleus reticularis tegmenti pontis; *Nt*, nucleus of the roof (fastigii); *Oi*, inferior olive; *P*, cerebral peduncle or crus; *Py*, pyramidal bundle and pyramid; *Pci*, *Pcm*, *Pcs*, inferior median and superior cerebellar peduncles; *Sgr*, gelatinous substance of Rolando; *Th*, thalamus; *V_4*, fourth ventricle; *III*, nucleus of motor ocularis communis nerves; *V*, descending branch of fifth nerve; *VI*, nucleus of sixth nerve.

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physiological bearing, especially taking account of the intimate ties which unite the nucleus of the roof and the nuclei of the vestibular nerve.

The globosus does not have any relations with the cortex of the lateral lobe. It is a part of the vermis and enters into connection principally with the paramedian lobe (Horsley and Clarke).

No matter which nucleus is concerned, the relations with the cortex are always direct; each region of the cerebellar cortex is in relation with a nucleus or with nuclei of the same side. These fibers do not cross the median plane (Clarke and Horsley).

To sum up, the fibers of projection of the cerebellar cortex are destined for different nuclei according to the region. It is to the nucleus of the tegmentum and accessorily to the nucleus globosus that the fibers of the vermis are projected. The fibers of the cortex of the lateral hemispheres project themselves to the dentate nuclei.

On the other hand the vermis receives fibers from the medulla and from the spinal cord. The lateral hemisphere receives fibers from the middle cerebellar peduncle which unites it with the cerebral cortex. Clarke and Horsley are therefore correct in basing their conclusions upon these anatomical considerations, when they distinguish two systems in the cerebellar cortex: a spino-cerebellar system, and a cerebro-cerebellar system. The same authors note also that as auditory sensations are located in the temporal lobe, that the sensations of equilibrium and orientation which are dependent upon the vestibular nerve, should have their seat in the same neighborhood. These last are localized by Mills in the posterior third of the temporal lobe (second and third convolutions). As I have already remarked it is precisely in this region, or adjacent regions, that the bundle of Türck (external bundle of the central peduncle) takes its origin. This bundle goes to the nuclei of the pons, which are the origin of the middle cerebellar peduncle.

Thus crossed relations are established between the temporal lobe, the center of labyrinthine representations, and the lateral lobe of the cerebellum. Clarke and Horsley insist upon the physiological importance of this fact.

Fibers of Association.—The paths and extent of these fibers

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have been particularly well studied by Clarke and Horsley by the method of secondary degeneration. Their conclusions are as follows: Some fibers pass from the vermis to the lateral lobes, but never beyond the plane of the paramedian lobe (cat, dog and monkey), some arciform association fibers take a lateral path as far as the second lamella from the edge of the lesion, rarely as far as the third. Extensive lesions of the vermis, and particularly those of the median lobe, are followed by extensive degenerations of arciform fibers which follow an antero-posterior path and are contained therefore in the vermis. The fibers which go to the nodule are very few.

These experiments have shown the almost complete independence of the vermis and the lateral hemispheres. There are no commissural fibers between the two lateral parts of the cerebellum. The same authors furnish some information as to the caliber of the different systems of fibers. The fibers of projection, or cortico-nuclear, are fine, or medium-sized fibers. The arciform fibers, or fibers of association, are fine fibers. As to the nucleo-peduncular fibers, the superior ones are large; the intermediate fine; and the inferior ones of medium caliber.

IV. *Embryological Significance of the Cerebellum*

At the commencement of the second month of the life of the embryo two grooves are seen upon the lateral walls of the human spinal cord, two lateral grooves which divide each lateral side into two halves; the anterior or fundamental fold of His and the posterior or alar fold. The fundamental fold and the alar fold are united by a lozenge-shaped intermediary portion. It is at the expense of the fundamental fold that the anterior gray commissure, the anterior white commissure, the anterior cornu, the anterior tracts, the anterior part of the lateral tracts, and the anterior half of the arcuate formation are formed; they enclose all the nuclei of origin of the motor nerves.

The intermediate part forms the neck of the posterior cornu; the column of Clarke, the reticular process and the posterior part of the lateral tract (crossed pyramidal tract and the direct cerebellar tract of Flechsig). The posterior part or alar fold forms the posterior cornu, and the posterior cord, and receives the roots of the sensory nerves. At the level of the medulla, as in the

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spinal column, the fundamental fold gives rise to the motor nerves. The alar fold receives the termination of the medullary sensory nerves.

The alar fold then divides into two segments: the one internal or jugal, and the other external or rhomboidal lip of His. The jugal segment becomes later on, first, in the medullary regions, the nucleus of the tract of Goll, the gray wing, the acoustic tubercle; and second, in the pontine region, the locus cœruleus.

The rhomboidal lip forms in its turn first, in the medullary region, the medullary or inferior olive, the accessory olivary nuclei, the nucleus of the tract of Burdach, the nuclei of the lateral tracts, the arcuate nuclei of the pyramids, and the gelatinous substance of Rolando. The fibers which arise from them will form the internal arcuate fibers of the medulla, the system of olivary fibers, the trapezoid body, the interolivary layer and the restiform body. Second, in the pontine region the pontine olive, the gelatinous substance of Rolando, the internal arcuate fibers, the trapezoid body and the fold of the cerebellum (J. and A. Déjerine).

The cerebellum, therefore, is developed along the path of the sensory tracts, and as an accessory of the sensory tract. At first it is a double organ, the two parts of which unite afterwards in the median line. The cerebellar fold first develops the vermis in its median portion; it is there that the first grooves to the number of three or four appear towards the third month of intrauterine life. The grooves of the cerebellar hemispheres appear during the fourth month. The cerebellum does not acquire its final form until about the fifth month. The fibers of the vermis myelinate much earlier than those in the hemispheres.

V. *Comparative Anatomy*

The cerebellum follows a course in its development in the animal series parallel to that of the nervous system in general. Rudimentary in fishes it acquires its maximum of development in mammals.

The cerebellum of fishes is situated behind the optic lobes and consists of an elongated appendix, adherent by its base in front, and free behind, implanted upon the sides of the spinal cord. The superior face is traversed by an antero-posterior groove.

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The surface is smooth in the bony fishes; in the cartilaginous fishes it is divided by grooves into lamellæ analogous to those in the superior vertebrates. The division into lamellæ is found in sharks and fish of the same order. In the sturgeon family the cerebellum is represented only by a little ball of fat.

Edinger remarks that the *Myxine,* a worm-like fish which lives within the bodies of other fish as a sort of parasite, or on rocks where it fixes itself, has no cerebellum. The flat fish which lives in the sand has a cerebellum much less developed than other fish of the same family.

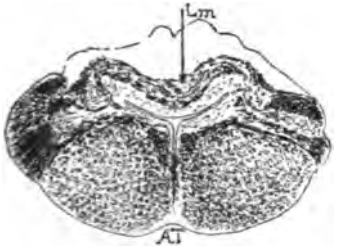

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FIG. 30. Section of the medulla and the cerebellum of a snake (morelia argus). It is reduced to a simple transverse fold. (Stained by the method of Pal.)

FIG. 31. The encephalon of a crane. The cerebellum, seen in profile, is represented by a voluminous vermis and a very small lateral appendix.

The cerebellum of reptiles is reduced to a simple transverse fold placed across the fourth ventricle, viz., toads, frogs, lizards, vipers, etc. (Fig. 30). The cerebellum is wanting in the salamander which lives under the ground. In the tortoise it has a globular form and its volume is greater than that of the optic lobe. In the turtle the cerebellum is twice as large as it is in the tortoise (Edinger); according to this author, this is due apparently to the great activity which the animal displays in swimming. The cerebellum of the crocodile is folded upon itself several times and possesses two lateral appendices.

In birds the cerebellum takes on a much greater development; even when compared with the whole encephalic mass (Fig. 31). In spite of this it is formed almost entirely by the median lobe composed of transverse lamellæ varying in number from ten to

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twenty, according to Leurat. In some birds the cerebellum is provided with two small lateral appendices, the first appearance of the lateral lobes of the mammals. The lateral appendices are scarcely visible in the chicken, the goose, the thrush and the sparrow. They are observable in the partridge, the pigeon, the ostrich, the duck, and the crane. The birds which rise and sustain themselves in the air like the cranes, and those whose wings and legs have considerable power, as the loon (of Bassan), and the parrots, have their lateral appendices more developed (Serres). The grooves and the folds are developed proportionately to the size of the birds. Comparing the weight of the cerebellum in different species of birds, Lapicque and Girard conclude that it seems related to certain functional attitudes. The development of the cerebellum would seem remarkable in birds of prey and in sea birds. A comparison with the pigeon and the snipe would seem to indicate an especial relation with soaring; this is practically the same opinion formerly expressed by Serres. The cerebellum of birds contains equally two organs; the cortex and the central gray nuclei. The central gray nuclei are four in number: two median and two lateral (Brandis). Besides these the bridge of nerve substance which joins each side of the vermis to the continuation of the spinal cord contains a nucleus which is in immediate juxtaposition to the lateral nucleus of the cerebellum, and which belongs to the nuclear apparatus of the eighth pair (Fig. 32).

The experimental researches of Frenkel on the pigeon permit us to establish the existence of a certain number of systems of fibers which present some analogy with those in mammals. The afferent fibers come from the base of the posterior cornu of the spinal cord, from the nuclei of the posterior columns, and from those of the corpora bigemini. The majority of them terminate in the cortex. The nuclear contingent is very scant. The fibers which come from the cerebellar cortex form the commissural fibers and the fibers of association, in addition to the fibers of projection which go to the central nuclei. Some fibers attain the nuclei of the vestibular nerve. The greater number of the efferent fibers take their origin in the median and lateral nuclei, and are destined for the nuclei of the vestibular nerve (in birds, as well as in mammals the relations of the cerebellum and the nuclei

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of the vestibular nerve are very intimate), to the motor nuclei of the fifth nerve, and of the facial nerve, as well as to the motor nuclei of the spinal cord. These fibers occupy the lateral tract,

FIG. 32. Transverse section of the cerebellum and medulla of a pigeon (Weigert-Pal staining), intended to show the central gray nuclei.

Na, anterior nucleus; *Np*, posterior nucleus and its relations with the eighth nerve (*VIIIv*); *Scv*, cerebello-vestibular bundles; *NB*, nucleus of Bechterew.

and are partly direct and partly crossed, to the olivary nuclei of the prolongation of the spinal cord, to the posterior longitudinal fasciculus which they follow to terminate in the oculo-motor

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nuclei, and in the spinal cord (anterior bundle), to the red nucleus of the opposite side and to the optic thalamus.

FIG. 33. Transverse section of the cerebellum of the macaque monkey. (Stained by the method of Pal, enlarged 3.7.)
Nal, antero-lateral nucleus; *Npl*, posterior lateral nucleus; *NL*, lateral nucleus; *Nm*, median nucleus.

The lateral appendices of the cerebellum of birds takes ón a much greater development in mammals and become the lateral lobes. The number of lobules and lamellæ increases with the

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height and weight. The relation of the median lobe to the hemispheres varies according to the different species. The median lobe is very large in the rodents, it is much smaller in the ruminants, the solipedes and carnivoræ. The progressive growth of the hemispheres is still more marked in the monkeys and apes (Figs. 33 and 34), and attains its maximum in man. It seems

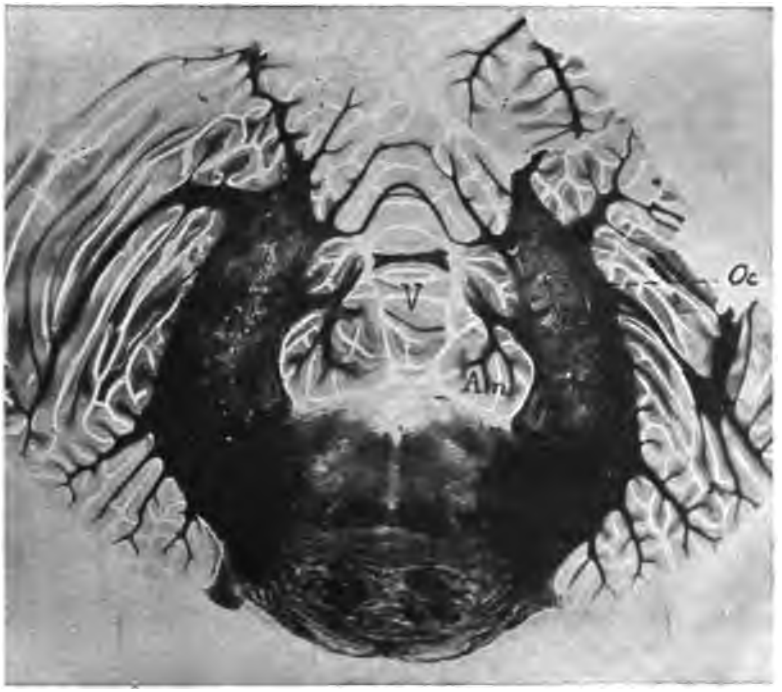

FIG. 34. Vertico-transverse section of the pons and the cerebellum of a chimpanzee (Weigert-Pal) to show the considerable development of the anterior stage of the pons, the cerebellar hemispheres and the cerebellar olives (*Oc*).

V, vermis; *Am*, amygdalæ. Enlargement 2.

subordinated to that of the cerebrum. The importance of the pons and the middle cerebellar peduncle is accentuated in the same way. In the anthropoid apes the anterior surface of the pons increases considerably in size, at the same time with the middle cerebellar peduncle and the lateral lobe (Fig. 34).

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In mammals, as a study of secondary degeneration proves, there are intimate relations between the central gray nuclei of the cerebellum and the nuclei of the vestibular nerve. In all mammals except man the nucleus of Bechterew is continued as far as the nucleus of the tegmentum, under the form of little bridges

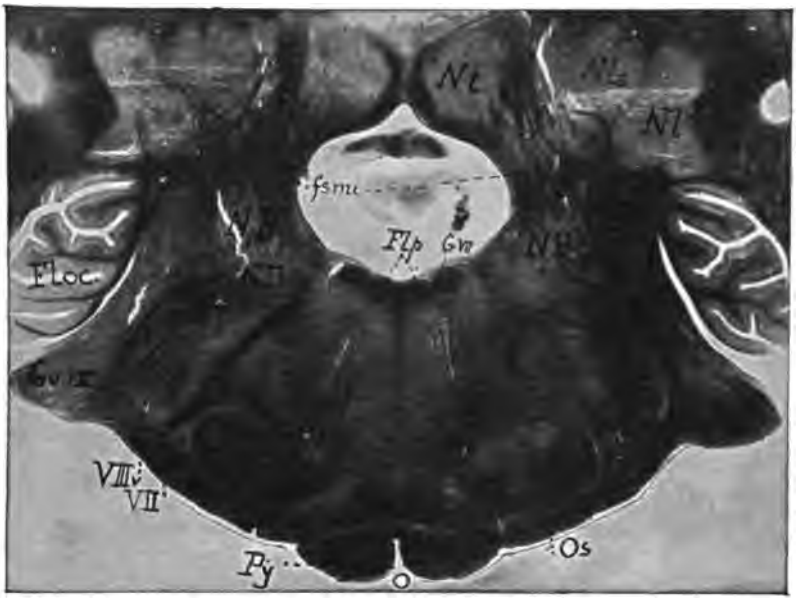

FIG. 35. Photograph of a transverse section of the medulla and the nuclei of the cerebellum of a dog (stain Weigert-Pal). Relations of the nuclei of the cerebellum with the nuclei of the vestibular nerve by means of the internal semicircular fibers (*Fsmi*).

Floc, flocculus; *Flp*, posterior longitudinal fasciculus; *CvVIII*, ventral nucleus of the auditory nerve; *GVII*, genu of the facial; *NB*, nucleus of Bechterew; *MD*, nucleus of Deiters; *Nt*, nucleus of the roof; *Nl*, lateral nucleus; *Nla*, antero-lateral nucleus; *Os*, superior olive; *Py*, pyramid; *VII*, facial; *VIIIv*, vestibular nerve.

of gray substance intercalated between the tracts which go from the vermis to the prolongation of the spinal cord (Weidenreich). This is the same anatomical disposition that has been described by Brandis in birds. In consequence of this disposition of anatomical connections, which unites the nucleus of Bechterew with

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the cerebellum, this nucleus can just as well be considered a cerebellar nucleus as a vestibular nucleus.

It is only in the highest mammals such as the superior apes and man, by reason of the considerable development of the cortex of the lateral lobes, that the rhomboid body or cerebellar olive takes on the folded appearance which has given it the name of the dentate nucleus. In all mammals four central gray nuclei can be distinguished: the median nucleus, the antero-lateral nucleus, the postero-lateral nucleus and the lateral nucleus (Fig. 35). The median nucleus corresponds to the nucleus fastigii, or nucleus of the tegmentum, in man. The antero-lateral nucleus to the emboliformis, the postero-lateral nucleus to the globulus, and the lateral nucleus to the dentate nucleus.

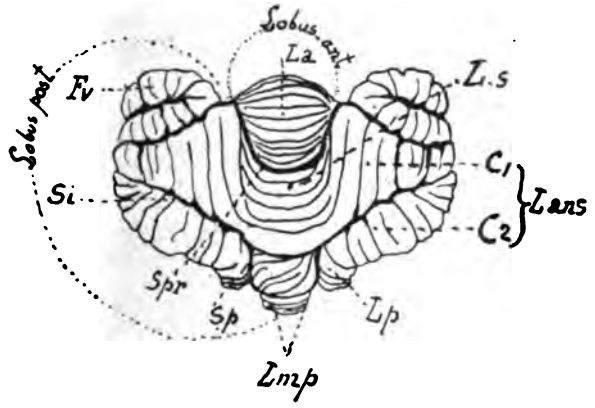

FIG. 36. Cerebellum of a dog. Superior surface. (Nomenclature of Bolk.) *Fv*, vermicular formation of petrous lobe; *La*, anterior lobe; *Lam*, auriform lobe; *C–1*, crus primum; *C–2*, crus secundum; *Lmp*, posterior median lobe; *Lp*, paramedian lobe; *Ls*, lobus simplex; *Si*, primary groove; *Sp*, paramedian groove.

Of late Bolk has contributed some important work on the comparative anatomy of the cerebellum, in an effort to establish a parallel between the degree of development of this or that part of the cerebellum, and the synergy, or greater or less individualization of the movements of the anterior and posterior limbs. He has thus defined cerebellar cortical localizations for the anterior limbs, the posterior limbs, the head and the trunk. Bolk combats

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the classic opinion according to which the cerebellum is divided into a median lobe or vermis, and into cerebellar hemispheres. He considers the cerebellum of all mammals to have two lobes: the anterior lobe and the posterior lobe, separated by the primary groove (Fig. 36).

The anterior lobe is formed of transverse juxtaposed lamellæ.

The posterior lobe is divided into two parts, anterior and posterior. The anterior or lobule simplex is slightly developed and

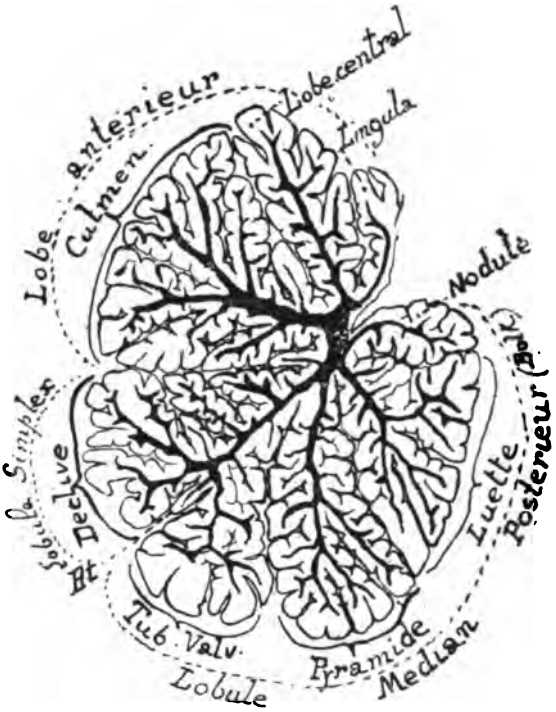

FIG. 37. Sigittal section of the vermis (man). (Application of the nomenclature of Bolk.)

formed, like the anterior lobe, of transverse lamellæ. The posterior part is composed of a median lobule and two lateral lobules. The median lobule, small and limited on each side by the paramedian groove, is subdivided into three parts, anterior, median and posterior. In each lateral lobule Bolk distinguishes three

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parts, the ansiform lobe, divided into two arms, the anterior and posterior by the intercrural groove, the para-median lobule and the vermicular formation of the petrous lobe. This disposition is especially well shown in the cerebellum of the dog. The anterior lobe corresponds in man to the central lobe, the culmen, and anterior quadrilateral lobe. The lobule simplex to the declive and to the posterior quadrilateral lobe (Fig. 37). In these formations there is no necessity to distinguish a vermian and a hemispheric portion; each lobe is considered as a whole.

In the posterior part of the posterior lobe, the ansiform lobe, which in man takes on a very great development, is the equivalent of the superior semilunar lobe, of the inferior semilunar lobe, of the lobus gracilis, and of the digastric lobes all together. The paramedian lobe becomes the amygdalus, and the vermicular lobe, the flocculus. In each kind of mammal, each of these parts takes on more or less importance in relation to the others, according to greater or lesser development of this or that group of muscles. The muscular groups of median organs with synergic functions have their seat in the median part of the cerebellum, in the same way that the centers of coördination of the lateral groups of muscles have their seat in the lateral parts of the cerebellum, where this function is independent of homologous groups of the same side.

The anterior lobe is the center for all the muscles of the head. The lobule simplex is the center for the muscles of the neck. The posterior part of the median lobe contains the centers of the synergic movements of the upper and lower limbs. The ansiform lobule, the independent centers of the upper and lower limbs. This is why the median lobe is developed in animals where the muscular work necessitates the synergy of movements of the upper and lower limbs. In man where the movements of the limbs have attained their maximum of individualization, the anciform lobe attains also its maximum of development.

The tonsil or amygdalus and the pyramid appear to be the centers of the movements of the trunk; the flocculus that of the movements of the tail.

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CHAPTER II

EXPERIMENTATION.—DESTRUCTION OF THE CEREBELLUM

PARTIAL OR TOTAL DESTRUCTION OF THE CEREBELLUM IN THE DOG

The phenomena observed in the dog will be taken as examples and described first. I will pay particular attention to the results of my own experiments without, however, neglecting the observations made by other physiologists who have occupied themselves with this question. The variations observed according to the different kinds of animals will then be taken up with a special note for the effects of the destruction of the cerebellum in the monkey.

I. *Destruction of a Lateral Lobe and the Corresponding Half of the Vermis*

(Fig. 38)

Immediate Phenomena.—Most of the animals having been operated upon in narcosis (ether, chloroform, chloral, or morphine), the phenomena described under this heading should not be confounded with the phenomena which would be produced at the moment of destruction if the animal were not anesthetized. The immediate phenomena which are about to be described are those which manifest themselves when the animal comes out of the phase of narcosis and begins to awake.

The animal moves little by little and emits plaintive whines. The body is shaken by a general trembling, more apparent in the muscles of the back. It tends to place itself in opisthotonos, the head is bent backwards, the anterior extremities are in tonic extension. When from time to time the animal attempts to make some movements, the tonic contraction of the members in extension increases.

When the animal has completely awakened, to these phenomena are added others, which follow one another, particularly when the body is not supported on the operated side. These are move-

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ments of rotation or rolling around the longitudinal axis. To observe these phenomena the animal must be taken from his cage and placed on the ground with his belly to the earth; the body then describes a curve with the concavity towards the operated side, and rests upon this side. This scoliosis is still more manifest if one hold the animal up by taking hold of the loose skin at the back. The head is turned in the same direction but it describes at the same time a movement of torsion, so that the back of the neck is directed very much downwards and behind

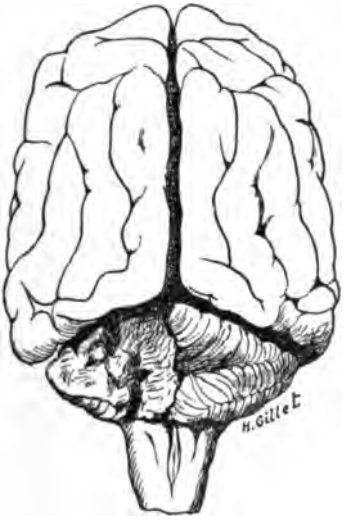

FIG. 38. Destruction of half of the cerebellum.

on the operated side, whereas the muzzle is turned in the opposite direction. The eye of the side operated upon looks inward and downward, whereas the other looks upwards and outwards. Both eyes are affected by nystagmic movements, which disappear, however, in a few days. This exaggerated movement of torsion of the head and of the neck is the beginning of the gyratory movement; the anterior half of the trunk then follows the movement of the head and the posterior half of the trunk is the last to turn (Fig. 39).

The animal thus turns over one or more times. These movements reappear spontaneously but there is no doubt that they are

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renewed with greater frequency under the influence of peripheral or sensory excitations, among which auditory sensations appear to be the most effective. These movements of rotation are of short duration, and hardly recur at all after the lapse of two or three days. The direction of the rotation is determined by the side upon which the animal falls, when he is placed on his four feet; as he always falls towards the operated side, one may say that the rotation takes place from the healthy side towards the operated side.

FIG. 39. Semi-schematic. Movement of rotation around the longitudinal axis from left to right which is observed after the destruction of the right cerebellar hemisphere along or associated with the destruction of the labyrinthine root of the same side.

In repose during the first days that follow the operation, the animal is contracted, he rests lying on the operated side with the head in extension and turned backwards towards the side of the lesion. The limbs are in extension, particularly the anterior ones. As regards the anterior limbs, as well as the posterior, those of

FIG. 40. Attitude of a dog after the left half of the cerebellum has been destroyed.

the operated side are the more contracted. The head is sometimes twisted so that the back of the neck looks downwards and backwards towards the operated side; the muzzle is then directed towards the healthy side. There is a conjugate deviation of the eyes toward the same side. The animal cannot lie down except

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on the operated side, or in a semicircle (Fig. 40). The curvature looking towards the operated side, the head lying upon the ground. When the animal is held up by the skin of his back the lateral curvature of the trunk increases (pleurothotonos), and half of the body, the operated half, rests always on an inferior plane to that of the healthy side. The anterior and posterior limbs are contracted in extension with a marked predominance on the operated side, and approach one another in consequence of this incurvation.

Phase of Reëducation or Restoration. Later Phenomena.— The pleurothotonos persists during several days, as does the extension of the limbs; up until the fifth day according to Lewandowsky. The animal attempts to lie upon his stomach, but in vain; he falls back almost immediately upon the operated side; it also attempts to make some movements, but always without success. Painful excitations provoke incoördinated movements, more marked in the limbs of the healthy side.

In the abdominal decubitus, when the animal succeeds in taking and maintaining this attitude, which he is not, as a rule, able to do for several days, the front legs are in marked abduction and the one on the operated side always more than the one on the healthy side. When it is able to lift its head from the ground, it describes lateral oscillations of increasing amplitude which cause the animal to fall again upon the operated side.

When the abdominal decubitus can be maintained for a few instants the animal tries to rise upon its four legs. At first it raises the anterior half of the body, resting upon the two front legs. Tremor and oscillations of the head and of the trunk immediately appear and result in a fall, always on the operated side.

Three or four days after the first attempts, when the equilibrium can be maintained for a certain time seated with the fore paws stretched wide apart, the dog makes some attempts to walk. One fore paw, nearly always the one of the operated side, is suddenly lifted from the ground as in walking, but the body immediately collapses on the operated side, a fall is inevitable; or this movement is repeated several times without effect, since the posterior portion of the body is immobile and fixed to the ground, and prevents progression. Nevertheless, the animal sometimes succeeds in advancing a few inches, dragging the rest of the body, which slides along on the rump of the opposite side.

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At the end of a few steps, however, the fore paw of the operated side doubles up under the body and the animal falls on this side. In all these movements the fore paw of the injured side appears feebler and less mobile than that of the healthy side. At rest during abdominal decubitus it is nearly always in supination. Many more days are necessary before the animal can pass from this imperfect position to a position on its four paws; before it succeeds there are numerous attempts. The front legs always being in abduction, the posterior portion of the body is at first only half sustained, and more on the healthy side than on the operated side, where the rump is nearer the ground. As soon as a fore paw is lifted, the body falls down. Little by little, the

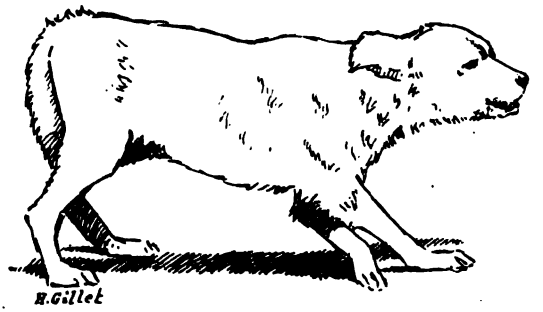

FIG. 41. The same dog at the moment of a fall, the left fore paw being put suddenly in adduction. (After a photograph.)

posterior half of the body is lifted higher above the ground, but for a long time, for several weeks even, it is upon an inferior plane to the anterior half of the body.

Fifteen days after the operation, equilibrium can be maintained on the four paws for a short time, after which the tremor and oscillations of the trunk, either antero-posterior or transverse, reappear and entail a fall. The fall is still inevitable if one paw leaves the ground. Fatigue rapidly supervenes. During the position on the four paws it is not uncommon that the front legs separate as if the paws slipped on the ground.

It is from this moment that the animal makes serious efforts to walk. The anterior paws are wider apart than in normal standing. The one of the operated side is the more in abduction, and is usually the first to be lifted. Before leaving the ground

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it is the seat of contractions without effect, as if the animal hesitated. Then, suddenly, it leaves the ground. At the same time the whole body follows the movement and is laterally displaced towards the same side, as if animated by an irresistible movement of translation. The animal attempts to oppose this by some movements of the vertebral column in the inverse direction, but in vain; the posterior half of the body bends towards the operated side, and the fore paw at first in abduction comes suddenly back to adduction, and the animal tumbles in a heap to this side (Fig. 41). This is why, in these first attempts, the dog seeks a wall or some other obstacle to lean the operated side against.

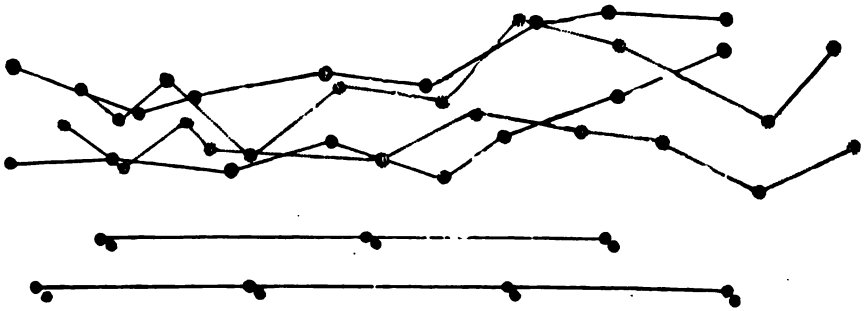

FIG. 42. Diagram of the walk of a dog deprived of the left half of the cerebellum. Fore paws in gray, hind paws in black. To the left fore paws placed in normal position. Below diagram of normal walk.

Gradually the displacements of the body become of lesser amplitude and the resistance to the movements of translation towards the operated side is prompter and more effective. The posterior half of the body raises itself higher from the ground. During the progress of walking the trunk is displaced, first to one side and then to the other (Fig. 42), each limb is lifted only after some hesitation. In the interval between the steps, wavering is constant, the gait resembles that of a drunken person, whence the name, "drunken gait."

From now on there is a marked improvement daily; wavering progressively diminishes, and the oscillations of the body and the head become slighter. On the other hand, the body no longer has the suppleness it had before the operation. It is as if it were ankylosed; the head is held stiffly, always inclined towards the

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side of the lesion; the paws are not lifted with the same regularity nor at the right time, and the limbs of the operated side are lifted suddenly and replaced with equal brusqueness.

After re-learning to walk, the dog learns to run again. During this reëducation, phenomena of the same type are reproduced, but of a lesser intensity. The body does not follow a straight line, but sways excessively, either to one side or to the other. The limbs of the operated side are still lifted too suddenly and too high. The total of the movements is lacking in harmony, whereas, in a normal dog running one fore paw is lifted almost at the same time as the hind paw of the other side, in the dog deprived of half of his cerebellum this simultaneity is not so perfect.

On stopping, the tremors, oscillations and displacements of the body reappear. The same thing happens every time there is a modification in the conditions of equilibrium, or a change of position.

During the first days the dog can neither eat nor drink by himself, he cannot seize meat which is presented to him, and he cannot drink unless one holds his head, then he laps like a normal dog. Even several days later he is not able to seize food with his mouth; as soon as he advances or lowers his head, wide oscillations, at first localized in the head, pull it from one side to the other; they then affect the body, which is subjected to considerable displacement. The oscillations of the head increase in frequency and amplitude as the dog approaches the object, so at the moment of reaching it he is thrown far from it.

In drinking the same thing happens; the head goes further than the objective point and the muzzle instead of touching the surface of the liquid is plunged suddenly and deeply into it. The head is then suddenly thrown backwards, and this movement is followed by a movement of retreat of the whole body, which oscillates for some time in an antero-posterior direction.

These disorders of motion are augmented in progression on an inclined plane. If the dog attempts to mount a stairway, the head and the trunk are carried backwards to an exaggerated extent, and the animal falls backward. Similar defects occur in an attempt to descend; the moment the fore paw touches the step the body and the head are thrust forward and the animal falls,

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or the posterior half of the body is raised above the anterior half, and the dog turns a somersault. These disturbances are less pronounced if he is able to lean the operated side against a wall.

These phenomena tend to disappear with time, but slowly, more slowly even than the disturbances of progression and station.

Micturition is not accomplished in the normal way. It takes place always in the squatting position. The hind paws spread

43

44

45

FIGS. 43 to 45. Attitude at different periods of reëducation of a dog which has had the right labyrinthine root and the right cerebellar hemisphere sectioned. They are the same as in a dog which has simply been deprived of the right cerebellar hemisphere but in the latter case the reëducation is more rapid.

further apart, but they always keep in contact with the ground. Attempts at micturition and defecation are accompanied by severe antero-posterior oscillations. At first a fall is inevitable.

Coitus is impossible, not because the genital instinct is abol-

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ished or diminished, but because the unstable equilibrium prevents it. Luciani even questions whether there is not an exaltation of the sexual sense. There is neither impotence nor sterility.

Swimming alone is still possible, on condition that it be not too prolonged, since fatigue rapidly supervenes. The healthy side is always immersed deeper than the operated side, the head is slightly inclined towards the healthy side, and progression is not made in a straight line but inclined a little towards the healthy side, so that the animal tends to move in a circle. When the dog comes out of the water and shakes himself, severe oscillations and displacements of the body are produced in a transverse sense; the same thing happens when the dog tries to scratch himself. Young dogs, which have never swum before having been operated on, are able to swim after the operation.

Several weeks after the operation nothing remains except a certain stiffness of the trunk, the brusque and exaggerated lifting of the limbs of the operated side, some oscillations at the arrest of movements, or in the change of attitudes, and the more prompt appearance of fatigue. In general, the movements do not appear to be so automatic and so spontaneous as before the operation. There is in them something intended, something willed. The tendon reflexes are exaggerated on the injured side.

There still exist, however, disturbances of equilibrium which can be easily demonstrated. It suffices to fix the attention of the animal and to present to him, for example, a piece of meat a little above the level of his head; as soon as he lifts his fore paws to raise himself on his hind quarters, the trunk oscillates markedly and titubation reappears in a very intense form. On the other hand, the suppression of sight control does not increase the disturbances of motility. Walking on an inclined plane still remains difficult.

During the first days which follow the operation, the dog does not bark; he recommences to bark only after he can stand up. Fatigue supervenes more rapidly than in a normal dog. His first attempts to walk exhaust him very soon; respiration becomes more rapid almost immediately, and before making a new attempt he rests for some time.

Russell has noted anesthesia and analgesia of the side of the operation during the first days which follow the operation.

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II. *Destruction of the Two Lateral Lobes*

When the two lateral lobes are removed (Russell), the initial phenomena are the following: The two eyes look downward and outward, nystagmic shocks direct the eyes outward and upward; they last only three days. The dog is incapable of standing. According to Russell, a motor paralysis affects all four limbs, the posterior more than the anterior. Instability is manifested and exaggerated under the influence of excitations or attempts at voluntary movement, but the rotatory movements are lacking. The anterior extremities are rigid, stretched at a right angle to the trunk, the posterior extremities are less so; the tendon reflexes are exaggerated. There is neither deviation of the head nor deviation of the eyes. Anesthesia and analgesia of the limbs are transitory.

III. *Total Destruction of the Cerebellum*

(Fig. 46)

The initial phenomena are less striking in intensity than those seen after destruction of one hemisphere. Reëducation, however, is slower and less complete.

Total destruction of the cerebellum is not easy to effect; either one takes away too much, or one does not take away enough; in other words, it is difficult to remove the whole cerebellum and to remove nothing but the cerebellum. This is why after autopsy it is necessary to make a microscopical examination of a series of sections of the medulla and the rhombencephalon to be certain that contiguous structures have been respected.

Immediate Phenomena.—Decubitus occurs indifferently upon one side or the other. The head is in forced extension, bent backwards without lateral inclination, the trunk describes a similar incurvation (opisthotonos), the limbs are contracted in extension, particularly the anterior ones. Movements of rotation around the longitudinal axis are less frequent and less rapid than after destruction of one hemisphere, and persist for a shorter time. They are more manifest when the destruction has not been complete or perfectly symmetrical. Rotation then occurs towards the side most injured. The menagery movements are sponta-

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neous, and are more often produced by peripheral or sensory stimuli, more particularly by auditory sensations. According to Munk such movements would be absent were the destruction total and symmetrical. When the destruction is complete and symmetrical, the rotatory movements are replaced by a hypertension of the head and of the trunk, with a tendency to draw back, and accompanied by retropulsion. The limbs are in a state of hyperextension.

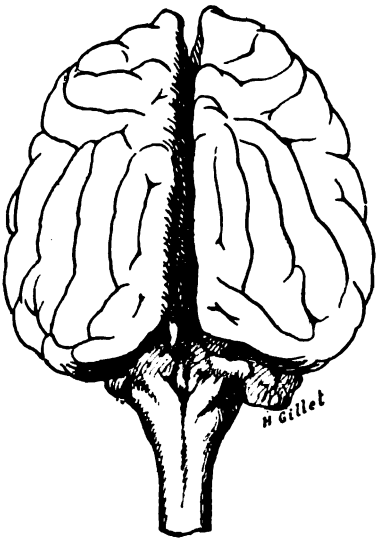

FIG. 46. Total destruction of the cerebellum in a dog. Only a small fragment of the right hemisphere remains.

The eyeballs generally show horizontal nystagmus. Strabismus is the consequence of an incomplete and asymmetrical destruction, the eyes being deviated to the side of the cerebellar hemisphere the most affected. During the first two or three days which follow the operation, there are troubles of deglutition and vomiting, which are the consequence of compression of the organs in the neighborhood. The same phenomena may be observed after a unilateral destruction of the cerebellum. Glycosuria has also been noted (Luciani).

Phase of Restoration. Later Phenomena.—After some days the dog makes efforts to lie upon the abdomen (Fig. 47). He

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hardly succeeds at all until after there has been considerable lessening of the contractions of the limbs, of the head, and of the trunk. Then he is able to pass from the side to the abdominal position. The first attempts generally cause an increase in or a reappearance of the contractions. The animal then falls imme-

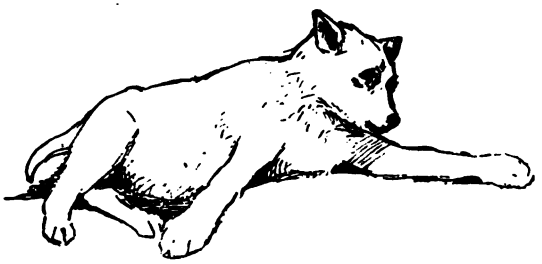

FIG. 47. Attitude of a dog subjected to a total destruction of the cerebellum. Extreme abduction of front legs.

diately to the right or left side. Little by little, he is able to lie upon the abdomen for some seconds. The fore limbs are in a state of extreme symmetrical abduction (Fig. 48), the head and the trunk are the seat of antero-posterior or lateral oscillations;

FIG. 48. Attitude of the dog during the first attempt to walk after total destruction of the cerebellum. Abduction of front legs. (After an instantaneous photograph.)

later the abduction of the fore limbs diminishes and the trunk is slightly elevated from the ground, but the instability persists and brings about a fall to one or the other side. The instability is proportionately greater as the animal makes efforts to move

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himself. When he is offered food a certain distance away from him, he tumbles over himself in his efforts to reach it.

After some days the hind part of the body is lifted from the ground, and the animal makes strenuous efforts to stand upon his four paws (Fig. 49). At first, as soon as the hind legs are in position, the oscillations reappear or increase in amplitude, and numerous falls occur. Nevertheless, after a certain time the dog is able to maintain a standing position for some moments, and he begins to learn to walk again (Fig. 50). From the very first the limbs, the anterior more than the posterior, are in marked abduction, each paw is lifted only after much hesitation, and leaves the

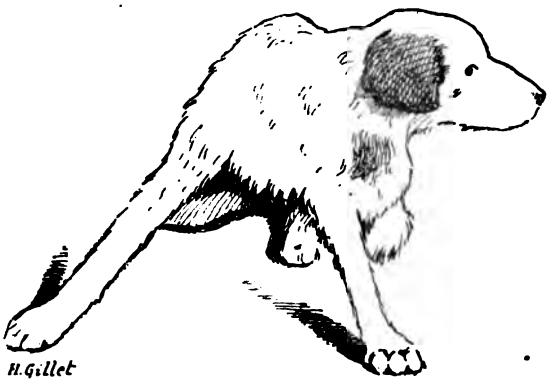

FIG. 49. Attitude during walking of the dog at a period when the amelioration is more advanced. The anterior limbs are less in abduction and the anterior half of the body is raised higher from the ground. The posterior limbs still remain in contact with the ground. (After an instantaneous photograph.)

ground suddenly and falls back in the same manner. One does not observe the movement of translation of the whole body to one side as seen after a unilateral destruction. On the other hand, an antero-lateral or antero-posterior balancing of the body is seen, when the oscillations increase in amplitude and eventuate in a fall when the paws are lifted from the ground.

Lifting of the limbs follows, but very slowly and with great irregularity. Each movement considered by itself is abnormal; The paws are raised either too suddenly or too high.

When the fore limbs are lifted and projected forward, the

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head is raised and carried backward, and if the movement has been forcible the animal falls backwards. In the same way when the fore paws again touch the ground and the hind paws are raised in their turn, the body is likely to be thrown forward and the muzzle bumps the ground. H. Munk (1907) described this gait as the "jumping gait." The hind half of the body being lowered, the front half with the head and the front extremities is raised suddenly, and then lowered, then the posterior half is raised with the posterior limbs in extension, immediately the two

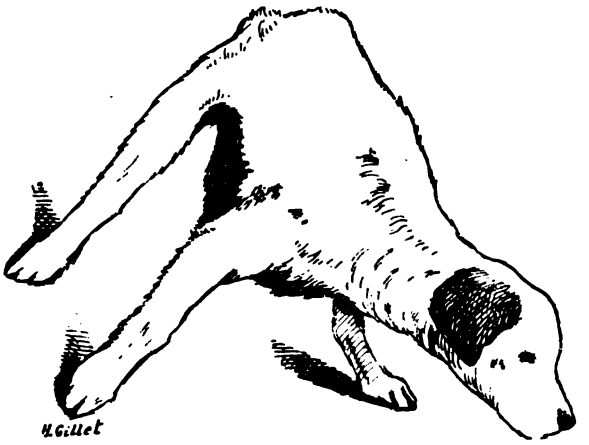

FIG. 50. Walking and standing at a period still more advanced. The animal can sustain itself on its four paws in abduction. (After an instantaneous photograph.)

extremities make a bound forward in such a manner that they all touch the ground at the same time or nearly so. According to the same author these movements lack proportion. That is why the animal tumbles forward or falls backwards. At a more advanced period of the reëducation the muzzle, or the rump, touches the ground more or less suddenly. However, these movements do not immediately succeed one another. Between the lowering of the fore paws and the elevation of the hind quarters there is always a slight pause. In this mode of progression the head is immobile as if the neck were ankylosed and the forehead lowered to the level of the back. According to Munk, the movements of the extremities are normal during walking. From

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the second week, he says, the dog lifted by the skin of its back executes movements of walking with its extremities; in the same way a dog lying down, which changes its position, makes a normal movement of walking. According to Lewandowsky the gait of dogs deprived of the cerebellum would be comparable to that of a cock or a cat. Either the animal lifts his paws in the exaggerated manner of a cock, or he drags them like a cat.

With time, however, the gait becomes less irregular; the abduction of the members diminishes; the movements are produced with more rapidity and the balancing of the body is less violent. In spite of this, however, for weeks and even for months wavering, tremors, and oscillations of the body can be observed. The animal does not regain his suppleness, he walks as though ankylosed. Progression is not made in a straight line. The trunk is displaced first on one side and then on the other; the limbs are lifted either too suddenly or too high. The rhythm of walking or of running is altogether upset. Fatigue supervenes rapidly, the animal is obliged to rest frequently. According to Munk, there is no further progress after eight or ten weeks.

The disturbances observed during feeding are comparable to those which have been noted in the case of unilateral destruction of the cerebellum. There is a tremor of the head which increases in amplitude as it nears the object. The tremor is sufficiently violent to occasion lateral displacements of the body. Similar phenomena are produced when the animal drinks; when the head is lowered towards the trough it is projected suddenly downward and forward, the muzzle bumps the bottom; the animal tries to lift it out and then this movement is also too sudden; the head is thrown backwards and carries the body with it, and the animal draws back.

The troubles of equilibrium and motility are at their maximum during progress on an inclined plane, such as the ascent or descent of a flight of stairs. This is accompanied by falls and somersaults. During the ascent of the stairway, as soon as the fore paw is lifted to be put upon a step, the head is placed in hyperextension as well as the body and the animal falls backward; inversely, during a descent as soon as a fore paw is put down a step, the body frequently slides forward and the animal rolls over, or it may fall to one side. These disturbances are almost exactly

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the same as those noted in the case of destruction of the lateral lobe, but they are more intense and more persistent. With practice these disturbances are progressively attenuated, so that after a certain time the mounting of a stairway only causes some hesitation and some oscillations. It is however, never so rapid, and never so automatic as it is in the case of a normal dog. During micturition, defecation and coitus, the disturbances are analogous to those produced by the destruction of one hemisphere, but they are more intense and last longer.

Swimming is much less disturbed than walking. The maintenance of equilibrium in water is preserved even when uncerible with the preservation of equilibrium. Wersiloff observed a Fatigue supervenes, however, more rapidly than in a healthy

FIG. 51. Attitude of a dog, deprived of the cerebellum, which became blind. The animal retains any position in which he is placed. Somniform state. Left to himself he preserves without change the attitude shown in the figure.

animal. When the ability to walk and to stand have been restored, the suppression of sight control does not sensibly increase the disturbances of equilibrium. On the other hand, it cannot be denied that sight has a certain importance during the phase of restoration. For several weeks I observed a dog that had become blind a fortnight after operation, in consequence of an ophthalmia. This dog never learned to walk again; nor even to raise himself; he remained immovable lying upon the side (Fig. 51).

The character does not appear to have suffered any notable modification. The dog operated upon recognizes the person who takes care of him and who brings his food. For several weeks he does not bark, in consequence, perhaps, of the fact that barking would entail modifications of the attitude of the head incompat-

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ible with the disturbances of equilibrium. Wersiloff observed a dog who never barked after the operation. He considered it a psychic disturbance (?).

Superficial sensibilty does not appear to be affected and the same seems to be the case with deep sensibility. Luciani, however, has observed a slight retardation in the response to tactile impressions. Ducceschi and Sergi observed a certain retardation in the correction of movements. Lewandowsky insists upon the fact that animals deprived of their cerebellum place their extremities in altogether abnormal positions, and that they do not rectify the abnormal positions in which they may be placed. For instance, a dog that has been laid on a table with one paw hanging over the edge of the table, does not draw it back. The whole hind quarters may be suspended outside the limits of the table without any reaction on the part of the animal. On the other hand, when the animal tries to seize a bone, very often the paw passes over it. This phenomenon, as will be seen further on, may be explained quite otherwise than by attributing it to a disturbance of sensibility. Moreover, the delay in the correction of vicious attitudes occurs not only in the limbs of the side operated on, but also in those of the side not operated on. The correction is only a little more slow on the operated side. When the animal commences to walk it is more difficult to make the limbs take abnormal positions. (For the interpretation of these phenomena see Chapter IX.)

The sense of pain seems to me to be intact. Russell, however, noted the absence of a reaction to pain in the fore paw of the side operated on, and in the two hind paws. Lewandowsky also contends that the sensibility of the skin to pain is diminished for an appreciably long time after the destruction of the cerebellum.

IV. *Total Destruction of the Vermis*

(Fig. 52)

Immediate Phenomena.—As soon as the animal tries to raise himself upon his paws, the head is forcibly drawn back, the trunk is bent in the same direction and the front limbs are in forced extension: This produces a fall backwards. In repose the front limbs are no longer in tonic extension. The head is in slight

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extension. The eyes look downward and vertical nystagmic oscillations take place.

Phase of Restoration. Later Phenomena.—The following days, at rest, the animal lies upon the abdomen, the fore paws are folded backwards along the body, the hind ones directed forward and very much separated, the head is stretched out in front and rests upon the ground. From the third day station on the four paws is possible, but the body and the head are the seat of rather severe antero-posterior and transverse oscillations. The anterior and posterior limbs are widely separated, the posterior

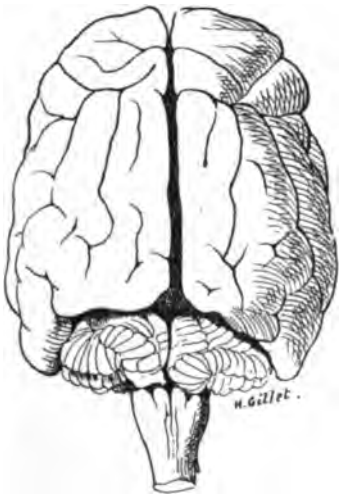

FIG. 52. Total destruction of the vermis.

always directed forward in an exaggerated fashion. During the six or seven first days progression is impossible. When one offers the animal a piece of meat and he lifts a paw to approach it he immediately draws back several steps and finally falls either backward or on the side (Fig. 52).

Five or six days after the operation the animal is able to take hold of food, but this action augments the disturbances of station, and provokes very intense antero-posterior oscillations. It is more difficult for it to drink, and at every attempt the head is drawn back brusquely entailing a backward fall.

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A week after the operation the ability to progress forward commences. The fore paws are spread widely apart and the hind limbs are also in marked abduction, and held in an exaggerated manner in front of the natural position (Fig. 53). They are detached from the ground with difficulty, then suddenly lifted and replaced in as sudden a fashion. The hind quarters describe a series of zig-zag movements, being carried alternately to the right and to the left. Walking is at first slow and accompanied by antero-posterior oscillations of the trunk. The oscillations increase during the taking of food, defecation and micturition. They persist almost indefinitely but become slighter during the performance of these various acts. They disappear at the end of three or four weeks, during standing on four paws and during walking.

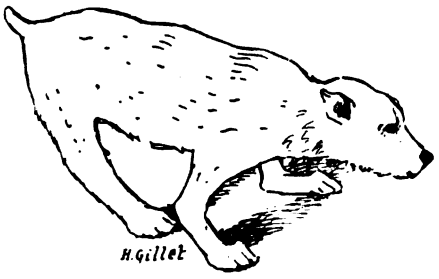

FIG. 53. Gait of a dog deprived of the vermis. Medium abduction of anterior limbs. Abduction and projection of posterior limbs.

After five or six weeks there is considerable amelioration in the act of walking. Nevertheless, abduction and forward projection of the hind paws persists. At about the same time the deviation of the eyeballs and the nystagmus have generally disappeared. Swimming is normal even in the case of puppies that have never swum before the operation. I have observed tonic hyperextension of the head and the front limbs, and drawing back in other animals; particularly in the case of a rabbit, which was not able to go forward for several weeks—it always went backwards.

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V. *Partial Destruction of the Vermis*

In the cat I have been able by means of a galvano-cautery to destroy the nucleus of the tegmentum on the left side. The lesion (after a histological examination on a series of sections) had slightly affected the lateral nucleus at its internal border.

After the fourth day the animal was able to walk, but it was always drawn backwards and to the left. The head was often bent backward vigorously in opisthotonos; it raised itself on its

FIG. 54. Attitude of a dog deprived of the left cerebellar hemisphere and the vermis. Falls backwards and to the right. (After an instantaneous photograph.)

hind quarters and fell backwards. At the beginning the front limbs were in hypertension and spread wide apart. The following days it displaced itself with bounds as if animated by a veritable movement of translation at first to the left and then to the right. This movement was also combined with a motion of drawing back. The limbs were in a condition of tonic extension. The head was rigid and slightly inclined to the left. The hind paws were lifted either too high or too suddenly, and were

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replaced in the same manner, striking the ground. Walking on an inclined plane increased all these disturbances and provoked backward falls. Eight days after the operation the movement of translation was still present and more marked towards the right than towards the left. These phenomena persisted until the death of the animal on the twenty-sixth day after the operation. The rigidity of the limbs and of the trunk was never so marked upon any of the other animals upon which I have operated. Perhaps the method of operation had something to do with it; that is, the destruction by the galvano-cautery.

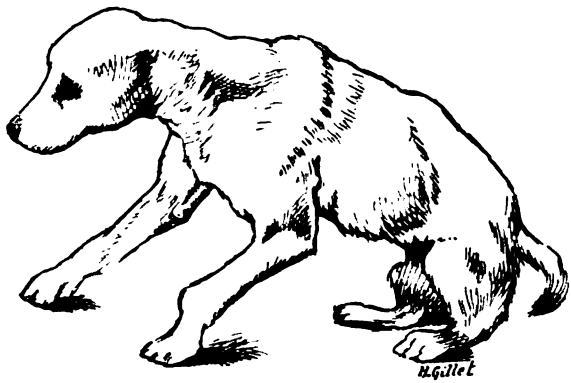

FIG. 55. Attitude of the station of the same dog. Abduction of the anterior limbs. (After an instantaneous photograph.)

When the destruction of the vermis encroaches upon one of the hemispheres, or even on both of them, the symptomatology approaches that following destruction of the hemisphere or the total destruction of the cerebellum (Figs. 54 and 55).

The destruction of the posterior half of the vermis, pyramid and declive, gives rise to the following phenomena (Russell): The immediate or transitory phenomena are downward and slightly outward deviation of the eyeballs, and vertical, rotatory or variable nystagmus. The animal walks upon a very much enlarged base. Instead of holding itself upon its hind paws it rests upon that part of the limb which extends from the ankle joint to the toes. Instability of the head increases on all movement, whether accidental or voluntary. During walking each fore paw

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is raised before the other one has touched the ground. The posterior limbs stay in the positions which have just been indicated. The dog thus gives an impression of a circus horse standing on his hind legs. Backward falls are very frequent. The rotation movements are lacking; the tendon reflexes are exaggerated. Rigidity of the members is slight. Sensibility is only dulled, and is completely restored after a week. When the destruction trenches upon the anterior half of the median lobe, the tendency to fall backwards is less marked. These phenomena become less marked little by little, and after several weeks it is difficult to find a clearly defined difference from the normal condition. The animal is able to stand up on his hind legs and take hold of meat.

The destruction of the lateral half of the posterior part of the median lobe (Russell) is followed by a slight incoördination and a slight rigidity in the limbs of the same side, with an exaggeration of the tendon reflexes. The eye on the side of the lesion is deviated downwards and outwards. There is nystagmus on looking towards the opposite side, and on looking upwards.

Similar results had been obtained by Ferrier. He had noted that after lesions of the posterior part of the median lobe the head was drawn backward and the animal tended to fall backwards when he attempted to walk. Inversely when the anterior portion was injured, the animal stumbled and had a tendency to fall forward.

VI. *Longitudinal Section of the Vermis*

Magendie had already practiced section of the cerebellum into two equal lateral halves. Then the animal appeared to be alternately pushed to the right and to the left without being able to preserve any fixed position. If he rolled once or twice towards one side, he turned back and rolled the same number of turns towards the opposite side.

On the other hand Ferrier had observed that the disturbances of equilibrium are of slight importance, and that there is no trace of a tendency to vacillation or to rotation. When the lesions are symmetrical, the disturbances of equilibrium are always slight.

These are the results of the latest experiments of Trendelenburg.

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During the first days the spastic phenomena are lacking, as well in the limbs as in the vertebral column. When the animal attempts to raise itself the limbs are abducted and the trunk is close to the ground. The oscillations of the body which appear when the animal stands are exaggerated when it eats and drinks. At the end of fifteen days all these symptoms are considerably diminished, and they disappear at the end of three weeks. The author concludes from this that the crossed paths of the cerebellum, which were interrupted, have been compensated for in this very short time.

VII. *Localized Lesions of the Cortex of the Lateral Lobes*

My personal experiments show that the disturbances are less marked in proportion as the gray nuclei have been respected. Exclusively cortical lesions give rise to phenomena of the same order as lesions involving both the cortex and the central gray nuclei, but they are generally transitory and do not last more than ten or fifteen days. These phenomena may be lacking if the lesion is very limited. However, I make certain reservations in view of more recent experiments made by various physiologists. In my animals equilibration did not appear to be disturbed. But perhaps a more minute analysis of the motility of the members might have revealed some slight signs which escaped me (see page 294).

DESTRUCTION OF THE CEREBELLUM IN THE MONKEY

These experiments have been made by a number of physiologists, particularly by Luciani, Ferrier and Turner, Russell, Lewandowsky and Munk. They were performed almost exclusively on the *Macacus* monkey.

The phenomena produced by total or partial destruction of the cerebellum are altogether comparable with those which have been observed in dogs and other mammals, but the more perfect skill and education of the fore limbs of the monkey, particularly the faculty of prehension possessed by the hand, permits a better study of the motor disturbances engendered by a total or partial suppression of the cerebellum, and gives a more general point of view of the functions of that organ.

In general, the immediate phenomena are less striking and the rotation momements less marked.

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I. *Destruction of one Cerebellar Hemisphere*

Great instability with frequent falls follows the unilateral destruction of a lateral lobe. The vertebral column is curved presenting a concavity towards the side of the lesion. According to Russell, the cervical column is turned in such a fashion that the side of the face corresponding to that of the lesion is directed upward (?). According to Luciani, the rotation of the cervical column towards the uninjured side is associated with strabismus and nystagmus. The eye of the side operated upon is deviated downward and inward, that of the opposite side upward and outward. The animal falls very frequently and has a tendency to turn around the longitudinal axis. The movement follows the direction of torsion of the head and neck, or the strabismus, that is to say, from the side operated upon towards the healthy side (Luciani). But if one determines the direction of the movement according to the side upon which the animal falls, the movement is made towards the operated side. In seeking to fix the direction of rotation according to certain rules and to interpret from these the results obtained by the various authors, one cannot be absolutely sure that all agree that the rotation takes place in the same direction. Not having made any personal observations upon the monkey, as I have done upon the dog, I am unable to give a definite answer to this question.

During the first days the monkey lies upon his stomach, the members in abduction, with the side operated upon at a lower level (Luciani). When he wishes to displace himself he climbs in a sort of a manner, the limbs being very widely spread apart. During these various efforts the head and the trunk oscillate; the movements of the hand, especially those of the side operated upon, are very irregular and any support within reach is grasped. Instead of being in extension as in the dog, the anterior limbs are flexed.

From the first few days which follow the operation the animal is able to climb. The following days there is an amelioration of this condition; the animal walks better; the limbs of the injured side are stiffer and held further from the body than those of the other side; they are raised and replaced without coördination. Later, they are moved in a peculiar manner which Ferrier and Turner compare to a movement of creeping. The animal often

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describes circular movements towards the operated side; the tremors and oscillations diminish during repose, and reappear to a sufficiently marked degree during voluntary effort. Ferrier and Turner compare this tremor with the intention tremor of multiple sclerosis.

When the monkey is seated upon the ischiatic callosities, he fixes himself on the ground with two hands or with one hand only, or he may hold a piece of furniture. To avoid the oscillations of the head or of the body he will lean his head against a wall.

These phenomena become less marked by degrees. The corrections are produced more rapidly in the monkey than in the dog (Luciani). One or two months after the operation the monkey hardly differs from a normal monkey except for the slight incurvation of the vertebral column, and the incoördination of the movements of the limbs of the operated side.

The hand is less dextrous on the operated side than on the other side. The animal uses it less voluntarily (Luciani). The movements of prehension are abnormal. When he uses this hand he seizes the object either too much on one side or too near to him or too far from him (Lewandowsky). The movement is not properly measured, but there is no deviation in a determinate sense. In the same way he does not hold an object readily in his hand. Lewandowsky notes besides some disturbances in the appropriateness of the movements. For instance, when the monkey wishes to climb he seizes the bar between the third and the fourth finger. These last facts are contested by Munk. According to him the monkey only exceptionally seizes the bars of his cage in an awkward manner. The tendon reflexes are exaggerated on the side of the lesion.

Luciani contends that there is paresis of the limbs of the operated side. Russell holds that the posterior limb of the opposite side is thus affected. Ferrier and Turner and Munk do not admit that there is any diminution of muscular force.

Disturbances of sensibility, denied by Ferrier and Turner, are noted by Russell, for whom there is an anesthesia and analgesia having the some distribution as the motor paresis. According to Lewandowsky deep sensibility is also disturbed. A monkey deprived of half a cerebellum takes abnormal and vicious attitudes

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with the limbs of the corresponding side and does not correct positions impressed upon them.

II. *Total Destruction of the Cerebellum*

The results of the total destruction of the cerebellum in the monkey recall very closely those which have been observed in the dog.

As soon as he comes out of anesthesia, he attempts to seat himself, but does not succeed, and falls on the side. In repose he rests upon the stomach, with the posterior limbs doubled under him. When he attempts to sit up he falls always on the stomach. He is obliged to be satisfied then with moving the head and the extremities. In order to feed he attempts to crawl; if he tries to go to the right, he rolls to the right; if he tries to go to the left, he rolls to the left. If he succeeds in raising himself to a sitting position or a standing position he falls almost immeditely, either forward, backward or to the side. He can hold himself seated when he seizes a bar of the cage; he falls as soon as he lets go.

During the first few days it stays lying on its stomach, with the posterior and anterior limbs in abduction, the knees and the shoulders flexed; the abduction persists during attempts to walk. In repose the tremors disappear fairly rapidly, but reappear upon the occasion of the least effort or voluntary movement. They present the same characters as the so-called intention tremor of multiple sclerosis. For this reason the animal is not able to feed itself; from the first days it attempts to climb but in an oscillating manner. The gait is vacillating and awkward. The animal is carried either too far to the right or to the left, and the trunk is drawn to one side or the other. Hence there are frequent falls, fatigue supervenes quickly, and the necessity for repose ensues. The gait gradually amends, but it never becomes completely normal. It resembles at first the walk of a drunken man, and later it becomes slow and dragging. According to Munk, progress ceases at the end of five weeks. The animals operated upon do not execute movements as well as healthy ones, they stay wavering and awkward; they have occasional falls and move their limbs less frequently. They do not rise without some object to hold on to. They can climb.

The tremor of the arms becomes slighter but always persists.

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In spite of this these monkeys are able to execute a great number of movements, eat from their hands, catch flies, etc. (Munk).

The tendon reflexes remain exaggerated. The disturbances of muscular force, admitted by Luciani, are denied by Ferrier and Turner, and Munk.

III. *Destruction of the Vermis*

The destruction of the median lobe entails disorders of a character less grave than does the total destruction of the cerebellum. After the awakening the head has a certain tendency to extension, and when the animal attempts to rise, he often falls backwards or upon one side or the other. In the first attempts to walk the limbs are in marked abduction, the stomach close to the ground and the body has a balancing movement. When they are not supported the head and the neck have an almost constant tremor. These disturbances gradually diminish. The balancing movement is less extensive, the limbs less widely stretched apart, but during walking they are lifted too high. On the other hand, they do not tremble, only the tremor of the head persists for a long time. During the first days, the backward falls are very frequent and occur spontaneously. The same phenomena are produced when the destruction involves only the posterior portion of the vermis (Ferrier and Turner), or when the vermis has been divided in the median line.

A monkey in which Ferrier had destroyed the posterior portion of the median lobe with the actual cautery was able to stay seated easily by holding to a support; if it let go it tended to fall upon the back. In the same way during walking and running it fell or tumbled backward.

Destruction of the Cerebellum in Fishes and in Reptiles

A destruction limited exactly to the cerebellum is difficult to accomplish. The cerebellum in fishes is reduced to a fold which is very thin and very narrow, and one always runs the risk of removing too much. Vulpian and Philippeaux made many experiments on fish, particularly on the carp and tench, and were not able to observe any recognizable modification of movement as long as they removed the free portion of the cerebellum only. The fish swam as well after as before the operation. On the

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contrary as soon as the instruments touched the cerebellar peduncles the movements became very disordered, "the fish becomes very much agitated, it swims in turning round upon itself, and moves its fins in a very incoördinate manner." According to Vulpian these symptoms are not to be imputed to the suppression, but are due to the irritation of the cerebellar peduncles.

Luys observed after operation that the movements of swimming were slow and uncertain. The body swayed from one side to the other, like a floating body without direction and reduced to a state of uncertain equilibrium.

On the other hand Steiner affirms that the ablation of the cerebellum in fish is not followed by any disturbance whatever.

To sum up, the effects of the destruction of the cerebellum in fishes, according to Vulpian, Luys and Steiner, are less noteworthy than they are in birds or in mammals. The most of these experimental researches, however, were not completed by an anatomical examination which would permit us to maintain that the lesion had not affected some of the neighboring organs.

The same remarks apply to the researches which have been made upon the cerebellum of reptiles and batrachians. We cannot accept the results except with certain reservations, since they have not been controlled by a minute anatomical examination.

After the destruction of the cerebellum, the frog moves its legs in various ways without coördination so that according to Flourens, "there is no longer any real gait." On the other hand, according to Steiner, the movements are only less precise. Vulpian and Philippeaux were not able to observe any great disturbances of locomotion.

In the adder, the undulations which constitute the mode of progression of this animal, and which are so regular and so nicely coördinated, become irregular and incoördinated. "The animal does not advance at all, and the vain efforts which exhaust it do not enable it to change its position. The lizard is not able to walk, nor to hold itself up upon its paws" (Flourens).

Destruction of the Cerebellum in Birds

The larger number of the experiments of Flourens were made upon the cerebellum of birds, and more particularly upon the cerebellum of the pigeon. He repeated them on the turkey,

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the magpie, the swallow, the duck, etc. The cerebellar mutilations were followed by a loss of harmony of the movements of coördination and equilibration. The symptoms are the more marked as the destruction is the more profound. Flourens suppressed the cerebellum in the pigeon in successive layers. Following the ablation of the first layers there was nothing further produced than weakness and disharmony of movement. During the destruction of the median layers the animal executed sudden objectless movements, it was only upon the destruction of the deeper layers that the animal lost the faculty of jumping, flying, walking and standing up, which had been more and more disturbed by the superficial and median mutilations. "Placed on the back the pigeon was unable to raise itself, it moved wildly and continually but never in a firm and determined manner." It was unable to hold itself in a standing position except by the aid of its tail and wings. When it walked it progressed like a drunken man going too far to one side or the other. It wavered and fell frequently.

According to Flourens these diverse coördinations are not lost simultaneously. In proportion as the animal loses its cerebellum it loses gradually the faculties of flying, then of walking, and, finally, of being able to stand upright. One can at will suppress only flight, or suppress flight and walking, or suppress all at the same time, flight, walking, and the ability to stand up. When the cerebellum is thus destroyed by successive sections, each of these faculties is progressively altered before being completely lost.

"The animal commences by not being able to stay for a long time upright upon its legs, it staggers almost every instant. Then its feet are not sufficient to preserve station and it is obliged to have recourse to its wings and its tail; finally, any fixed or stable condition becomes impossible."

It is the same in the case of the gait, which is from the very beginning staggering as in drunkenness. When the mutilations are deeper the animal is unable to walk except with the help of its wings, and finally it is unable to walk at all. Partial resections of the organs do not determine any except temporary disturbances. In a young cock from which Flourens had taken the whole superior half of the cerebellum, wavering dimin-

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ished from the fourth day after the operation, fifteen days later equilibrium was totally reëstablished. It was the same thing in the case of a pigeon which had only been deprived of half of the cerebellum. On the other hand, a chicken from which the whole cerebellum had been removed, had not recovered its equilibrium four months after the operation.

Longitudinal or transverse sections of the organ do not disturb the functions of coördination and equilibrium except for a few days.

Superficial punctures on one side of the cerebellum were followed by a rather marked weakness of the opposite side, and the destruction of a lateral half, was followed by a very marked weakness of the opposite side of the body.

The destruction of the cerebellum of other birds gave analogous results. The coördinations related to swimming were equally disturbed, a duck placed in the water made movements of swimming with its feet but in an incoherent and ineffectual manner.

These results have been controlled by various authors. The symptoms differ a little according to whether the destruction is total or partial. In the last case the birds describe circular movements towards the same side or towards the side opposed to the lesion (Wagner). At the end of several days these phenomena become considerably less marked, and one is hardly able to observe anything more than the tendency of the limbs to be put in extension and the torsion of the head and neck and the peculiar tremor which Wagner compares with the tremor of paralysis agitans. This tremor becomes exaggerated if one takes hold of the animal or if one feeds it. Besides, all of the movements appear to be feebler than in a normal bird (Dalton).

I intentionally insist very little upon the disturbances determined by the destruction of the cerebellum in the inferior vertebrates. Most of the researches in this direction were made at a time when the essential elements of the experiment were lacking. That is to say, the anatomical control, and the analysis of the symptoms was rather rudimentary. Besides, in animals where the movements of the limbs are only slightly differentiated, it is more difficult to study the nature and the mechanism of the anomalies of motility. It would, however, be interesting to take up these experiments again taking into account all of these considerations.

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CHAPTER III

EXPERIMENTATION (*continued*)

STIMULATION OF THE CEREBELLUM

Stimulation of the cerebellum is far from giving such constant results as experimental destructions in animals, or lesions of the cerebellum in man.

Whereas, certain physiologists indicate precise reactions in relation to the stimulation of this or that cerebellar part others doubt even the excitability of the cerebellum. Some deny this property to the cortex, but accord it to the central nuclei.

Since it is impossible to give a definite solution to this problem it seems best simply to recount the results obtained up to now by the different forms of stimuli (mechanical, chemical, and electrical). This last is about the only one employed by contemporary physiologists. Renzi tried to stimulate the cerebellum of birds by means of a pin, but without results. The first serious attempts of this description were made by Weir Mitchell. He excited the cerebellum by applying or injecting caustics (injections of mercury, applications of perchloride of iron, or tincture of cantharides, and refrigeration by an ether spray). The immediate phenomena, incoördination, drawing back and backward falls are of short duration. The more enduring phenomena are characterized by a rather marked weakness of all movement, whether voluntary or involuntary.

Nothnagel, stimulating the cortex by a red hot needle, provoked muscular contractions at first localized on the same side as the excitation, and then generalized. The disturbances are always more grave and persistent when the stimulation affects the median third of the vermis. Similar results have been obtained by Baginsky.

In all these experiments the interpretation of the results is a very delicate matter. A part of them are attributable to irritation of the organ and another part to destruction. In the phenomena observed by Bouillaud, in 1827, in the course of his attempts to destroy the cerebellum by actual cautery, the author

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himself distinguishes disturbances due to the destruction of the organ and those which are the results of irritation. The first consist in faults of coördination, of gait and of station. The irritation determines leaps, tumbles, pirouettes, and an agitation analogous to epilepsy. For these methods (cauterization, and physical or chemical stimulation), Ferrier in 1878 substituted electricity and employed it in a systematic fashion on many types of animals.

Electric stimulation is applied in the same way as in the experiments made upon the cerebral cortex, but the cerebellum is less easy to reach than the cerebrum. The excitability of the cerebellum is subject to great variation, and it is necessary sometimes to wait for a certain time before the phenomena manifest themselves, and only upon a relatively small number of animals was Ferrier able to obtain any satisfactory results. They deserve, however, to be recorded.

Electrical Stimulation of the Cerebellum of Monkeys

I. *Pyramid of the Median Lobe.*—Both eyes turn to the left or the right in a horizontal plane, according to whether the electrodes are applied to the left or to the right. At the same time forward or backward movements of the head are produced.

II. *Superior Vermiform Process (Posterior Extremity).*—Both eyes look directly downwards when the electrodes are applied exactly in the middle of the prominence. This looking down of the eyes is generally associated with a forward or downward movement of the head. On the left side both eyes look down and to the left, on the right side both eyes look down and to the left, on the right side both eyes look down and to the right.

III. *Superior Vermiform Process (Anterior Extremity).*—In the median line, both eyes look directly upwards. At the same time the head is drawn backwards. One notes also a tendency to separation of the legs and some spasmodic movements of the arms. These movements of the head and limbs, according to Ferrier, are not due to the transmission of the current to the corpora quadrigemina. In all his experiments, barking and whining, which are indices of an irritation of the posterior corpora quadrigemina, are lacking. When the stimulation is carried to the left, the eyes look diagonally upwards and to the left.

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There is a movement of the head upward, backward and to the left. With the stimulation to the right, the eyes look diagonally upwards and to the right, and there is a movement of the head, upward, backward and to the right.

IV. *Lateral Lobe* (*Semilunar Lobule*).—On the left side the eyes look upward and turn to the left, on the right side, the eyes look upward and turn to the right.

V. *Flocculus.*—The eyes turn around their antero-posterior axes.

Whatever the region stimulated, the movements of the limbs are always produced on the side stimulated. They are sudden, spasmodic, and difficult to describe. The pupils contract—more so on the excited side. Nystagmus is often produced at the beginning of the stimulation.

Electric Stimulation of the Cerebellum in Dogs and Cats

Electric stimulation of the cerebellum of the cat and dog is difficult and the field of experiment is limited. The proximity of large venous sinuses only allows a very incomplete view of the organ.

Pyramid.—To the left, the eyes look to the left. To the right, the eyes look to the right.

Posterior Extremity of the Superior Vermiform Process or Declive.—In the middle, the eyes look downward; to the left, the eyes look downward and to the left; on the right, the eyes look downward and to the right.

Lateral Lobe (*Right Postero-Superior Lobule*).—Both eyes look upward and to the right. Both eyes look upward and to the left. In the dog there is at the same time a rotation around their axes.

Right Flocculus.—Rotation of the ocular globes around their antero-posterior axes, first to the right and then to the left. Contraction of the pupils has been observed. Nothing can be affirmed as to the movements of the head or of the limbs.

Electrical Stimulation of the Cerebellum of Rabbits

Median Lobe.—In the superior part the two eyes look to the right, on a horizontal plane. Median and inferior part, the two eyes look to the left on a horizontal plane.

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Lateral Lobe, Left Side.—Superior lobule, rotation upward and inward of the left eye; rotation downward and outward of the right eye. Median lobule, rotation upward and outward of the left eye; rotation downward and inward of the right eye. Inferior lobule. The two eyes turn to the right on their antero-posterior axes.

In general, there is produced simultaneously a bulging outward of the eyeballs, movement of the limbs of the same side, dilatation of the nostrils, and movements of the ears.

Electrical Stimulation of the Cerebellum of Pigeons

There is produced no movement of the eyes. The head is drawn backwards and to the stimulated side. The homolateral wing flaps and the corresponding leg is retracted.

Electrical Stimulation of the Cerebellum of Fishes

Irritation in the median line produces a bulging of the eyeballs and upward incurvation of the tail, and a stretching out of the fins. Irritation on the right makes the right eye bulge, the tail is bent to the right, and the fins stretched out. The same phenomena are produced when the stimulation is reversed, but the orientation of the movements is made to the left, and the left eye bulges.

Ferrier has compared the effects of electrical stimulation of the cerebellum in animals to the phenomena observed in man, when a galvanic current is passed through the cranium at the level of the cerebellar region. These phenomena consist of vertigo—called galvanic vertigo. When the current is passed from the right to the left, the positive electrode or anode, being applied in the right mastoid fossa, and the negative electrode or cathode in the left mastoid fossa, the subject experiences an illusion that the objects which it sees are animated by a movement comparable to that of a wheel parallel to the face, which turns from right to left (Purkinje). If the eyes are closed, the subject feels that he himself is turning, he feels himself drawn from right to left. At the same time, the head and the body lean towards the anode, and the eyeballs move in the same direction, and are the seat of nystagmic shocks.

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The objective phenomena of galvanic vertigo recall the movements of the eyes, the head, and the limbs of animals whose cerebella were stimulated by Ferrier. Galvanic vertigo, however, is not a consequence of the stimulation of the cerebellum. It is absent in animals deprived of the labyrinth, or simply of the semicircular canals, and in individuals affected with lesions of the internal ear, or of the vestibular nerve. Many deaf mutes do not experience any sensation of vertigo, and do not execute any movements of the head, body, or eyes, during the passage of the current. Galvanic vertigo is due to an irritation of the vestibular apparatus.

The results obtained by physiologists who have followed Ferrier in this direction are less convincing. Employing currents of minimum intensity, Mendelssohn was not able to reproduce the reactions observed by Ferrier. He was only able to produce by an irritation of the cerebellum, limited to the lateral lobe, a deviation of the eyes towards the irritated side, contrary to that which is seen following an irritation of the cerebral cortex; the eyeballs often presented oscillatory movements. Dupuy also obtained reactions localized in the eyes, and most of the muscular groups by exciting different points of the cerebellum.

Wersiloff compares the effects of electrical, mechanical and chemical excitation of the cerebellum with those obtained by excitation of the cerebrum. Each half of the cerebellum is related to the corresponding half of the trunk; the vermis acts in the same way towards the two halves of the body. The superior vermis reacts upon the inferior limbs; the inferior and posterior vermis upon the superior limbs. Its action is not limited to this. The skin muscles and the conjugate movements of the eyes are also dependent upon it. Excitation of the cerebellum produces nystagmic movements, horizontal, vertical and rotary, as well as the protrusion or the retraction of the eyeball, and winking of the eyelids.

Pruss, whose experiments were made upon the dog, admits the existence of motor centers in the cerebellar cortex. Each hemisphere contains centers for muscles of the same side. Excitation of the vermis in the median line produces bilateral shocks.

The results of his experiments are as follows: *Pyramid:* Deviation of the eye and the head to the same side and downward,

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homolateral dilatation of the pupil, elevation of the shoulder, flexion of the elbow, and an extension of the fingers. *Tuber of the vermis:* Homolateral rotation of the head to the side and downward, exophthalmis, mydriasis, contraction of the muscles of the back of the neck, of the back, and of the extensors of the homolateral anterior extremity. *Declive:* Contractions of the muscles of the back, particularly of the lumbar region, and of the extensors of the posterior extremity. *Culmen:* Contraction of the extensors of the posterior extremity. *Anterior segment of the monticulus:* Movement of the tail. *Uvula:* A motor influence on the anterior extremity, the ear, and the extensor muscles of the back. *Inferior semilunar lobe:* The eyes look downward, and there is an occlusion of the eye and movements of the shoulders. *Superior semilunar lobe:* Contractions in the extensors of the fore paw. *Quadrilateral lobe:* Contractions of the muscles of the hind paw.

The cortex is not excitable except by currents passing perpendicular or longitudinal to it. The longitudinal currents produce tonic contractions. The perpendicular currents produce clonic contractions. Negro and Roasenda employed bipolar and unipolar faradic currents. In the rabbit bipolar excitation of the crus primum produced muscular contractions of the face, and of the fore paw of the same side, when the intensity of the current did not exceed the limit of excitability of the region being explored. With stronger stimulation the muscles of the opposite side contracted at the same time.

With unipolar currents they were able to localize more precisely. The centers of the face and the fore paw are situated in the antero-lateral lobe, within and towards the anterior lobe and the lobule simplex. The center for the face is situated in front of that of the fore paw. It was sometimes necessary to prolong the current or to repeat the excitations in order to obtain a contraction. The same authors have made experiments which would tend to show that in order to arrive at the spinal cord and the muscles, the faradic excitations of the cerebellar motor centers are not obliged to traverse the cortical motor zone, either of one side or the other, nor the subcortical cerebral motor zone. These centers have an individuality of their own independent of the Rolandic area. The centrifugal motor influx would appear to go through the middle cerebellar peduncles.

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According to the results of the experiments of Lourié, made upon the dog and the cat, one is not able to show the existence of limited or special centers. When the excitation is limited to a very small area of the cerebellum, contractions are produced in almost all of the muscles of the same side of the body. Excitation of the semilunar gyrus produced adduction and elevation of the shoulder, concavity of the vertebral column towards the opposite side, an inclination of the anterior limb towards the right side if the excitation is on the left, and inversely. The posterior limb is thrust forward, and there are also movements of the tail, which is displaced towards the opposite side. With a more prolonged current and the excitation on the left, the right anterior limb is placed in extension, and turned to the right, the left anterior limb is placed in adduction and raised. Excitation of the vermis is followed by an extension of the anterior limb and an inclination towards the excited side. The vertebral column is curved and the concavity is turned in the same direction. Lourié was not able to verify the conclusions of Ferrier as to the movements of the eyes.

These contradictory results are probably explicable by the enormous intensity of the currents employed by these various physiologists. Under these conditions the phenomena observed are not in reality due to the excitation of the cerebellar cortex, but to the irritation of the subjacent nuclei, and diffusion through neighboring tracts.

This is the opinion held by Horsley. For him the cerebellar cortex is not excitable, and, consequently, cannot be considered as a motor center. When in the course of experiments with electric currents, the electrode is made to penetrate more and more deeply into the white substance, that is, when it approaches the central gray nuclei, and the para-cerebellar nuclei, Deiters' and Bechterew's, for example, the excitation becomes greater and greater with a current less and less strong. These nuclei are the true efferent, or motor, centers of the cerebellum. The cortex being considered by Horsley as a receptive center, analogous to the visual center of the cerebral cortex. Movements of the eyes, of the head, the trunk and the limbs are represented in these nuclei. The contraction produced by their excitation is tonic or hypertonic. Oscillations of the eyeballs are also produced, the

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contractile force augmenting with the excitation, but without clonicity when the excitation ceases. The application of the excitation unilaterally is followed by a homolateral effect, contrary to that which takes place in the case of the cerebrum.

The excitation of the superior part of the dentate nucleus deviates the eyes and the head to the same side. That of the dorsal regions of the dentate nucleus produces a bicipital flexion of the homolateral elbow. Whereas, the excitation of the basal region of the dentate nucleus, with a maximum stimulus, produces (in addition to the lateral deviation of the head and the eyes), a homolateral flexion of the elbow, a deeper excitation of the para-cerebellar nuclear region produces a contra-lateral extension of the elbow, a hyperextension of the neck and trunk and a forcible extension of the inferior limbs. So that, while the anterior limb is flexed at the elbow, the posterior is extended along the body.

The study of the excitation of the cerebellum by chemical irritants has been resumed by Pagano. This author injects curare into the various regions (one to three tenths of a cubic centimeter of a one per cent. solution). There seem to be distinct regions where the excitation produces isolated movements, either of the anterior limb or of the posterior. The stimulation of a certain point in the lateral lobe in the neighborhood of the vermis provokes a movement of retraction and adduction of the anterior limb of the same side, sometimes a flexion and adduction, more rarely of extension. This movement is maintained. The attitude which is determined by it may last for several minutes, and be reproduced during several hours. The extirpation of the respective cerebral center does not prevent its being produced. The excitation of another point very near the first produces tonic flexion, sometimes extension, of the posterior limb. The results are less constant for the anterior limb. In all these experiments the excitation is transmitted, sometimes, to the opposite side.

The excitation of a third point in the anterior and superior region of the vermis, provokes a tendency to fall backwards, which resembles a motor impulse. The excitation of the posterior part of the vermis provokes, on the contrary, a tendency to fall forwards, with the head striking the ground.

The excitation of the anterior extremity of the vermis, mon-

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ticulus, central lobe, and lingula, gives rise to a psychic agitation. Howlings, barkings, anxiety, terror and relaxation of the sphincters, all of which are accented under the influence of peripheral excitation, particularly auditory ones; the whole of which constitutes for Pagano a sort of psychic strychninism. At its maximum intensity it ends in generalized epileptiform convulsions. This is not due to a diffusion of the stimulation to the neighboring organs. The stimulation of the quadrigeminal bodies engenders phenomena which we must interpret as an expression of sentiments, or of emotions (Ferrier).

In order to be followed by results the injection must be made below the surface. A sub-dural injection is either without effect or gives different results. It is unfortunate that Pagano did not complete his experiments by a series of sections which would have permitted a topography of the lesions; lacking this we cannot accept these results except with a certain reserve.

By polar faradic excitation of the quadrilateral lobe (lateral part of the lobule simplex of Bolk), in the dog, Rothmann, 1910, obtained movements of the toes of the anterior extremity of the same side, movements of flexion by exciting the inferior part, and movements of extension by exciting the superior part. With stronger currents, the limbs were elevated. The excitation of the anterior lobe provoked movements of spreading apart and drawing back of the two anterior limbs.

Excitations of the cerebellum do not seem to always have the effect of augmenting the tonus of certain muscular groups. They may have the reverse effect. According to Sherrington, faradization of the anterior surface of the cerebellum produces a relaxation of the muscles of the neck, head and inferior limbs, principally on the side excited, in animals previously in a state of contraction due to decerebration.

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CHAPTER IV

EXPERIMENTATION (*continued*)

Effects of Section of the Cerebellar Tracts

Section of the Spino-cerebellar Tracts (Direct Cerebellar Tract of Flechsig and Tract of Gowers).—The effects of the section of the spino-cerebellar tracts (direct cerebellar tract of Flechsig and tract of Gowers) have been minutely studied by Russell, by Marburg, and lastly, by Bing, in a work devoted specially to this subject. The results obtained by Bing are as follows:

Unilateral Section.—In the upright station the limbs of the operated side are in abduction. The posterior limb more than the anterior. If the limbs are placed in their normal position the animal is unable to hold himself upright, and he immediately replaces them in the former position. The two extremities are in extension. The animal places very little weight upon the limbs of the operated side, resting almost entirely on those of the other side.

Neither oscillation nor wavering is observed, the trunk is slightly turned towards the operated side, but without scoliosis. If the paws of the operated side are placed on their dorsal surface the animal nearly always corrects this vicious attitude, but more slowly than a healthy animal does. There is nothing abnormal in the positions of sitting or lying down.

During walking the abduction of the limbs is still more marked. From time to time a stronger movement of adduction is produced which has for consequence a crossing of the paw over the limb of the healthy side. Before lifting the posterior limb from the ground there is a period of hesitation, and then it is carried further forward than that of the healthy side. Replacing it upon the ground, the action is brusque and sudden.

The gait is slow and cautious, like a normal animal which is forced to walk upon a narrow plank, but the general direction is

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well preserved and there is no lateral deviation. When the animal directs himself forward he has a tendency to describe a circular movement towards the healthy side. If he is compelled to go back, he turns to that side. He is more awkward when he is obliged to displace himself towards the injured side as when a piece of meat is offered to him on this side.

These disorders of locomotion described under the name of hemiataxia by Bing are exaggerated in various circumstances, such as the occlusion of the eyes, the acceleration of the gait, and the descent or ascent of a stairway.

The muscles of the pelvis and of the thighs are in no way paralyzed. There is a hypotonus of the operated side, particularly of the posterior limbs. When the body of the animal is suspended vertically, the limbs of the injured side give the impression of being weaker, and hanging down further. Their resistance to passive movements is feebler. The difference between the two sides is more striking in the muscles of the pelvis and the scapular girdle; it is hardly appreciable in the carpal and tarsal muscles. The reflexes are normal.

Improvement is rapid. At the end of four days the abduction of the limbs is very much less, as well in walking as in standing. Hypotonus is less marked. Four weeks after the operation the difficulty of turning toward the operated side is the only phenomenon that persists.

The ventral bundle (Gowers) and the dorsal bundle (direct cerebellar) seem to have the same functions. When the ventral bundle is spared, the disturbances are only less intense, and of shorter duration.

Bilateral Section.—The posterior limbs are in very marked abduction. The pelvis is lowered and the paws are directed forwards. The attitude of the anterior limbs is variable. Either they are spread apart, although to a lesser degree than the posterior ones, or, they are held very close together so that the paws touch one another. The head is lowered. The animal has an anxious, uneasy expression. There are neither transverse nor longitudinal oscillations. They do not occur unless the paw is lifted; as soon as it is replaced upon the ground, the animal resumes his steadiness. In lying down the attitude is normal; in the seated position the hind paws are directed outward.

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During walking the posterior limbs are in abduction. If the gait is accelerated, the posterior paws cross one another. The same thing happens to the fore paws, but to a lesser degree. The body is projected alternately to the right and to the left, as well for the anterior half as for the posterior half. The posterior limbs are carried very far forward, and the anterior limbs are thrown forward, as it were, the paws striking the ground instead of being replaced in a natural manner.

This awkwardness is increased during the occlusion of the eyes, and the ascension of a stairway, and when the animal goes backwards. The ability to jump is preserved. Tonus is diminished. Improvement occurs rather rapidly. Four weeks after the operation, it is only during running, and in gyratory movements that the animal experiences any difficulty. In the standing position a slight abduction of the posterior limbs and adduction of the anterior persists.

Bing concludes from his experiments that the phenomena in dogs after section of the spino-cerebellar bundles, or after the destruction of their terminations in the cerebellum, are the index of a double primordial alteration which has effect upon the musculature of the extremities. It is a special disturbance of muscular regulation and a diminution of tonus.

All these anomalies of station and locomotion are the expression of disturbance in the attitudes and movements which are seated at the roots of the limbs; that is to say, in the muscles of the pelvis and the scapular girdle.

To sum up, it is a question of a disturbance of the main movements of the extremities, principally the combined and associated movements. It would not be proper, however, to speak of any disturbances of equilibrium, as neither oscillations nor waverings are produced.

Section of the Inferior Cerebellar Peduncle.—This experiment, when the section is made very high, is difficult to accomplish. It is, however, absolutely necessary that the nuclei of the root of the eighth pair be respected.

Magendie noted movements of rotation after section of one of the peduncles, and he remarked that the rotation was always made from the side where the peduncle was cut; sometimes with such rapidity that the animal made more than sixty revolutions

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in a minute. He obtained also similar results by vertical sections of the cerebellum, but, "with this remarkable circumstance, that the movement was all the more rapid as the section approached nearer the origin of the peduncles." In the same way, after the section of the medulla oblongata, he observed a circular movement to the left or the right, like that of a circus horse according as the section was directed to the right or the left.

The symptoms described by Ferrier and Turner, and later by Russell, in the monkey are as follows:

After the operation the animal takes the following attitude: The neck and the trunk present a scoliosis, with the concavity turned towards the side of the lesion, the head is scarcely or not at all twisted on the longitudinal axis; when it is twisted the occiput is turned towards the side of the lesion and the chin towards the shoulder of the healthy side (Ferrier and Turner). The curvature of the vertebral column is increased when the animal is excited, or when an attempt is made to make him stand upright. When he lies it is upon the side of the injury and he returns always to this position if an attempt is made to place him in another. He executes rolling movements from the healthy side, towards the side operated upon, during the first twenty-four hours.

The motor disturbances consist in an impossibility to stand upright and in abnormal attitudes of the limbs. When the left peduncle has been divided the members of the right side are in extension, and those of the left side more or less flexed. These attitudes are dependent partly upon the rigidity and partly upon an alteration of the muscular sense, or of the notion of position. Perhaps also to a certain degree of motor paresis. Placed flat upon the ground, the limbs are in abduction; in this position the animal is capable of displacing himself by crawling. Later, about a week, when the first phenomena are somewhat amended, the animal walks and runs like an ataxic. The movements are incoordinate, especially in the limbs of the left side (the posterior paw of the side operated upon is the last to recover). It falls often on the left side, particularly when it is excited, and it cannot remain seated except by spreading the legs wide apart and holding on to some neighboring object. The eyes are directed downward and to the side opposite the one operated upon. The

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displacement outward of the eye of the healthy side is more marked than the displacement inward of the eye of the side operated upon (Russell).

This eye regains its normal position before the other one. After the disappearance of the ocular deviation, the animals are still incapable of directing their vision towards the injured side. Spontaneous nystagmus is rare. It appears only when the animal does not feel itself secure. The reflexes are exaggerated on both sides, more on the injured side (Russell).

During the first week sensibility to pain (superficial and deep) seems to be abolished in all four limbs. Deep sensation seems to return first. From this point of view, the anterior paw of the healthy side is the first to be cured and the posterior paw of the side operated upon the last (Russell). According to Ferrier and Turner, however, there are no disturbances of sensation.

The cerebral hemisphere of the side opposite the lesion is less excitable than the other. After an intravenous injection of absinth there are no convulsions in the anterior limb of the side of the lesion. The other three limbs contract. Three weeks after the section of the inferior cerebellar peduncle the convulsions in the two anterior limbs have different characters; on the side of the lesion the convulsions are more of the tonic type, on the opposite side they are clonic (Russell).

After hemisection of the cerebellar bundles at the superior termination of the spinal cord, intravenous injections of absinth give the same results as they do after section of the restiform body.

The animal reëducates itself gradually. At the end of three weeks it is able to maintain a more stable equilibrium; it only falls occasionally when it is excited, or when it is bumped into. In a *Macacus* monkey, which lived only two months, the equilibrium was unstable to the end and the movements of the limbs of the side operated upon were always more irregular than on the other side. The results consecutive to section of the inferior cerebellar peduncle may thus be summed up. Disturbances of equilibrium in standing and walking, falls and movements of rotation around the longitudinal axis towards the side of the lesion, incoördinate movements of the limbs on the same side, incurvation of the vertebral column with the concavity turned towards the

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injured side. In one word, there is an orientation and predominance of the symptoms towards the side of the lesion.

Section of the Middle Cerebellar Peduncle.—This experiment gave very contradictory results to the first physiologists who undertook it. Following Pourfour du Petit, who was the first to describe it, all are unanimous in observing the movements of rotation around the longitudinal axis, but the controversy begins with the direction of the rolling, whereas, for Magendie the rotation is made from the injured side; Longet describes it in the inverse sense. Schiff states that the rotation can be made in both directions; everything depends on the level of the section. The reason for these divergencies will be more fully discussed in the chapter "Interpretation." Ferrier and Turner have made experiments which were followed by anatomical verifications, the results of which are more convincing.

These authors performed transverse section of the median cerebellar peduncle of the monkey, directly outside the plane of penetration of the fifth pair. After the operation (the left peduncle was cut), the vertebral column was curved to the left, and the monkey rolled around the longitudinal axis to the left. The occiput was turned backwards and to the left, and the chin turned towards the right shoulder. The limbs of the right side were abducted and in extension. The left limbs were flexed and in adduction. Decubitus was on the left side.

The following days the animal lay on its stomach, the body inclined to the left; to move the body was slowly drawn forward. The movements of rotation diminished progressively, only the falling and the inclination of the body to the left side persisted. Ferrier and Turner, however, note falls and movements of rotation to the right side. (This last phenomenon appears to be the exception.) Whereas, standing up and walking were impossible, or very defective, the animal was still able to climb.

For several days equilibrium was very unstable. The trunk oscillated in standing and during walking. In order to maintain the sitting position the monkey was obliged to hold on to some neighboring object.

The limbs of the left side were animated by irregular movements and oscillations, but there was no fine tremor. (In this case the superior cerebellar peduncle of the left side had been slightly injured.)

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Equilibrium was progressively and slowly reëstablished. In spite of that a slight instability and a tendency to fall upon the left side always persisted. The tendon reflexes of both sides were equal; there was a very slight nystagmus.

To summarize: The rotation around the axis was made from the healthy towards the injured side, as Magendie had already noted, provided that one determines the direction of the rotation by the side upon which the animal falls, after having been placed in a standing position upon the four paws.

Magendie not only observed that all lateral sections of the pons produced a movement of rotation, but that this movement was arrested by a section of the opposite side. "Cut a peduncle," said Magendie, "and immediately the animal commences to roll, then cut the one of the opposite side, and at once the movements cease, and the animal loses the power to stand up and to walk."

Section of the Superior Cerebellar Peduncle.—This section has also been performed on the *Macacus* monkey under good conditions and with anatomical control by Ferrier and Turner. Immediately after the operation the animal cannot maintain its equilibrium, it remains lying upon its stomach, the limbs of the operated side flexed and in adduction, and those of the opposite side extended and in abduction. This attitude, however, may not be constant, all four limbs may be in abduction; all attempts to stand up and to move are followed by falls on the operated side and a tendency to roll in that direction. In its cage the monkey grips the bars with the limbs of the healthy side, in order to avoid a fall on the side of the injury. It is, however, still capable of climbing vigorously by using its four limbs. Nystagmus is inconstant; when it is present it is more marked in the eye of the injured side, and when looking in that direction. Gradually the animal becomes more stable, preserving, however, the same tendency to fall towards the side of the lesion; it wavers and balances its body. During the first days it is not able to maintain the position of sitting up, at any rate, not unless it is assisted.

From the beginning the limbs of the operated side tremble as a result of effort and of volitional movement. The tremor is comparable to that of multiple sclerosis. The animal takes food more readily with the hand of the side which is uninjured.

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Fifteen days later the disturbances of equilibrium have almost entirely disappeared. The animal does not fall unless it turns around or executes movements too suddenly; it can sit up without holding on to anything.

A *Macacus* which Ferrier kept for forty days after the operation did not fall towards the end, unless it were jostled; the tremor of the superior and inferior limbs persisted to the end, as did the nystagmus.

Summarizing, the troubles following section of the superior cerebellar peduncle are as follows: Uncertainty of equilibrium, falls, and a tendency to roll on the side operated, intention tremor of the same side and a permanent nystagmus. The tendon reflexes are equal on both sides.

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CHAPTER V

SYMPTOMATOLOGY OF THE AFFECTIONS OF THE CEREBELLUM

In man the symptomatology of the affections of the cerebellum corresponds to the phenomena noted after experimental destructions in animals. However, all the clinical observations cannot be used in this way for a physiological demonstration. Only those should be retained which by the precise determination of the nature and of the localization of the lesion, have the value of a true experiment. Consequently, we must eliminate all those complex cases wherein the lesion, although not exceeding the limits of the cerebellum, is nevertheless susceptible by its nature of compromising the functions of neighboring centers. This is the case in a large number of abscesses and tumors of the cerebellum, without taking account of the fact that in these cases the cerebellar symptoms may raise some difficulty of interpretation, and may be looked upon as phenomena of excitation or as phenomena of defect.

It is preferable to consider separately the observations in which the cerebellar lesions have commenced suddenly (hemorrhages, softening) and those in which the lesions have had a slow and progressive evolution. Only the first class can be rigorously compared to destructions performed upon animals. In both cases there is a sudden suppression of the organ and of its functions.

Finally, one must establish clinical differences as to whether the lesion is cortical or central, or both.

I. Hemorrhage or Softening

The symptomatology of hemorrhagic foci, or foci of softening of the cerebellum, is very slightly known for two reasons. The anatomical examinations are generally incomplete, and it is impossible to affirm that the symptoms are exclusively localized in the cerebellum. Many observations have been published simply

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as findings at the autopsy, that is to say, as having given rise to no symptoms during life. One may note, a propos of this subject, that it is more often than not impossible to fix the date of the commencement of the softening, and that, perhaps, several months or even several years have elapsed since the commencement of the lesion and the observation of the person who makes the examination, and that the symptoms may have had time to have completely disappeared, or nearly so.

Only those observations, followed by an histological examination made upon a series of sections, have any real documentary value, as well from the physiological as from the anatomical point of view. How is it possible to give a physiological signification to any observation if one is unable to affirm that the lesions are strictly localized in the cerebellum and do not trench upon the neighboring centers? The case published by V. Negel and A. Theohari is an example in point. The patient who was the subject of this observation presented disturbances of upright station, of gait, and of speech, dating back some six weeks before the time of his first examination. The body oscillated in an antero-posterior direction; when the patient passed from the dorsal decubitus to a seated position, he had a very manifest tendency to fall backwards; during walking the base of support was very much enlarged. The upper and lower limbs were affected by tremors during the execution of movements. The voice was nasal and words were emitted with suddenness. During the last days the patient fell into a comatose condition and all of the muscles were in a state of marked stiffness. The autopsy revealed a focus of softening in the left cerebellar hemisphere, which involved the white substance and the dentate nucleus. An histological examination upon a series of sections showed, besides some other small foci situated in the left superior cerebellar peduncle, the median fillet of Reil, the posterior longitudinal fasciculus, and the central bundle of the tegmentum; another involved the pyramidal bundle of the same side, and still another one the path of the right fillet of Reil.

To summarize: These symptoms were incontestably those of a cerebellar lesion and the principal lesion was situated in the cerebellum. However, some of the lesions were in the paths of the cerebellar tracts. If, however, one wishes to proceed to an inter-

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pretation in a rigorously scientific manner, one cannot but take into account the interruption of the other bundles, of which there would have been no question had not the authors made a conscientious anatomical examination of the case.

The principal symptoms of foci, of softening or hemorrhage of the cerebellum are: Titubation, with a widening of the base of support, disturbances of equilibrium, falls to the side or backward, according as the focus is situated in a hemisphere or in the vermis, an intention tremor or clonic movements of the upper limbs, sudden but non-ataxic movements of the lower limbs and rapid fatigue. As less constant phenomena, vertigo, ocular disturbances and nystagmus.

The symptoms of onset are less well known; apoplexy is usual, and vomiting has been frequently noted. On the other hand, movements of rotation or rolling, analogous to those which are produced in animals after the destruction of the cerebellar hemisphere, are exceptional. They are mentioned in an observation of Meschède. The patient had movements of locomotion, repeated in a determinate direction, affecting an impulsive form. Sudden goings and comings, movements in a circle, movements around the longitudinal axis, always from the left to right; the gait was also oscillating, the movements of the limbs awkward, and speech halting. The right cerebellar hemisphere was atrophied.[1] It is more common to see patients drawn laterally in the direction of the lesion, and consequently, to describe a sort of circular movement.

The symptoms predominate or only exist on the injured side. Some cases are noted of a unilateral paralysis or paresis, in direct relation to the cerebellar lesion. But is the paralysis really due to the destruction of a part of the cerebellum? Is it not rather the consequence of a concomitant lesion in another region of the encephalon? In several cases of hemiplegia I have found at the autopsy a focus of softening in the cerebellum, but on making an histological examination of the lesions and degenerations in a series of sections, I have found similar foci in the pons, and on

[1] Serres observed a patient who turned around himself from right to left, and the lesion was found in the right peduncle of the cerebellum. Belhomme also observed movements of rotation to the right in a patient in whom the left cerebellar peduncle was compressed by an exostosis.

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the path of the cortical motor tract. This condition is far from being exceptional.

To summarize: The symptomatology of hemorrhages or softenings of the cerebellum is still quite doubtful. It comprises disturbances of locomotion, of equilibrium, of motility of the limbs, and sometimes disturbances of speech. What relations exist between the seat of the focus and the clinical picture? What is the duration of the symptoms? Are there quantitative or qualitative differences, according as to whether the lesion affects the cortex, the white substance, or the central gray nuclei? So many questions await a precise rigorously scientific solution. Certainly limited foci in the cortex are more silent than those which cover a large surface of the cortex, or than central foci affecting the gray nuclei and the peduncles. But many of the notions which we have of this subject are still vague and undecided.

The majority of authors do not admit that lesions of the cerebellum can produce homolateral or direct hemiplegia (v. Monakow, Bruns, and Oppenheim). Contrary to this opinion, Mann described a cerebellar hemiplegia which is distinguished from a cerebral hemiplegia: First, by the fact that it affects all of the muscles, whereas, in a cerebral hemiplegia, certain groups only are affected more than others (dorsal flexors of the foot, flexors of the leg, extensors of the hand, external rotators of the arm, etc.); second, the absence of contraction; third, a simple exaggeration of the reflexes without spasticity, the absence of epileptoid trepidation, and of the Babinski sign.

This opinion is based upon observation and arguments, the value of which will be discussed further on.

II. Ageneses of the Cerebellum

The congenital atrophies of the cerebellum, or, better, ageneses, are rarely total. Either there is a lack of a cerebellar hemisphere or the cerebellum exists with a configuration resembling the normal, but reduced in all its dimensions.

Generally speaking, the clinical expression of these ageneses is very slightly marked, compared to atrophies developed in the adult or with tumors; sometimes there are no clinical symptoms at all.

In a case of almost total agenesis of the right hemisphere of the cerebellum, Neuburger and Edinger observed no disturbance

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which allowed them to suppose the existence of a cerebellar lesion. "There was no incertitude in the gait or the station; no weakness of the extremities, no nystagmus, no disturbances of speech, no vertigo, etc.; it was only noted that during infancy and adolescence, the head was often turned to the left, and oscillated." The right hemisphere was almost entirely lacking; it was about the size of a walnut, but of an entirely normal consistence and possessed well-formed convolutions. The vermis was altogether normal.

In a case of total agenesis of a cerebellar hemisphere, Nonne also observed no disturbance whatever.

A patient examined by Andral was incapable of doing the slightest thing that required application or dexterity. If, for example, she undertook any delicate work, she was immediately seized with a convulsive tremor of the hand. She was always afraid of falling when she walked. Her step was not certain. She was strong, robust, capable of lifting heavy burdens, but a feeble-minded imbecile. The left hemisphere of the cerebellum was altogether wanting, and in its place a sort of stump or tubercle was found. There was nothing abnormal in the cerebrum or the meninges. In this case a complete anatomical examination was not made.

A patient observed by Lallemant presented only a slowness of gait. The left cerebellar hemisphere was reduced to a small mass about the size of a hazel nut, attached to the lateral portions of the pons.

A patient examined by Hitzig had no motor disturbances up to the age of thirty-two. She had learned to walk at the regular time and could jump and dance. It was only after attaining the age of thirty-two that symptoms supervened which must be attributed to tabes and general paralysis. The right cerebellar hemisphere was reduced to two small lobules about the size of a bean.

Among the observations of total absence of the cerebellum, that of Combettes is the most celebrated. The cerebellum was represented by two small masses of white substance, having the volume of a pea. The cerebrum and the spinal cord appeared to be normal. The little patient had only lived for thirteen years. She developed very slowly and was backward from every point

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of view. She spoke with difficulty and with hesitation. Her legs, although very weak, were sufficiently strong for her to walk, but she fell frequently. She could use her hands with ease.

Anton observed a patient very comparable to the one of Combettes. It was the case of a little girl six years old, all of whose movements were slow and incomplete. She did not commence to sit up, to stand up and to walk until after she was four years old. She was unable to walk or to hold herself upright except by holding on to something. The movements of her legs were incoördinate. She staggered and fell frequently. The movements of the arms were slow and somewhat incoördinated. Fatigue supervened rapidly. Speech was not very clear, but there was no sign of tremor in the writing. The patellar reflexes were exaggerated. At the autopsy there was a total absence of the cerebellum.

In the case of a patient of Verdelli, nineteen years of age, the cerebellum was almost as much atrophied as in the patient of Combettes. Unfortunately, rachitic deformities of the skeleton and lower limbs prevented a study of the gait. The patient stammered. He was able to use his arms with facility and they were strong enough to support the weight of his body upon crutches.

There was also a total absence of the cerebellum in a patient of Shuttleworth's, fifteen years of age. A great general muscular weakness had been observed, combined with a tremor of the hands and arms. Besides, there was a very pronounced arrest of intellectual development.

An observation of Otto must be ranked in the group of partial ageneses. Clinically there was nothing particular to be noted except that the movements, forcible and dextrous, were febrile and impulsive. The cerebellum was very small. It was five centimeters wide and three centimeters at its greatest depth. (This was the case of a man thirty-nine years old.) The microscopic examination showed that this little organ was composed of absolutely normal elements.

The results of an examination of a boy with an epileptic psychosis reported by Borell, and in whom speech and walking became difficult from the age of ten years, is as follows: Movements were difficult and awkward, particularly of the legs. There was a bending of all parts of the body during walking, as if they were

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attached together only by loose ligaments. The feet interfered with one another. When he ran he manifested a certain degree of fear and turned his right side forward. He oscillated when he stood up in order to preserve his equilibrium. Speech was slow and scanning. The cerebellum was very small. The left hemisphere was completely lacking. The largest diameter of the right hemisphere was twenty-eight millimeters, and the vermis was very much reduced in size.

These observations of ageneses of the cerebellum are far from giving concordant results. To consider them only from a physiological point of view, one cannot but be surprised to learn that a unilateral agenesis so complete as that related by Neuburger and Edinger had a clinical evolution of so silent a character. The total ageneses of the cerebellum have a more marked symptomatology than the unilateral ageneses. In the majority of the observations motor disturbances have been mentioned, but they have been insufficiently described.

III. Atrophies of the Cerebellum

The cases of primitive atrophy of the cerebellum of a slow and progressive evolution form a very important group. Among the observations of these cases, however, there are very few that are physiologically utilizable, because along with the systemic lesions of the cerebellum there are also systemic lesions of other organs, particularly of the spinal cord. An exception should be made in the case of olivo-ponto-cerebellar atrophy, of which we have published either alone or with M. Déjerine several observations followed by autopsies. The one which we examined with M. Déjerine is the only one in which the atrophies and degenerations were strictly localized in the cerebellum: The pons and particularly the anterior layer and the olives were equally atrophied, but these are organs which enter into direct relation with the cerebellum.

The following is a list of the anatomical lesions: (1) A symmetrical atrophy of the cerebellar cortex more pronounced in the hemisphere than in the vermis, and contrasting with a relative integrity of the central gray nuclei, *i. e.*, the dentate nucleus, the nucleus of the roof, the globulus and the embolus (Figs. 56 and 57); (2) total atrophy of the gray substance of the pons and

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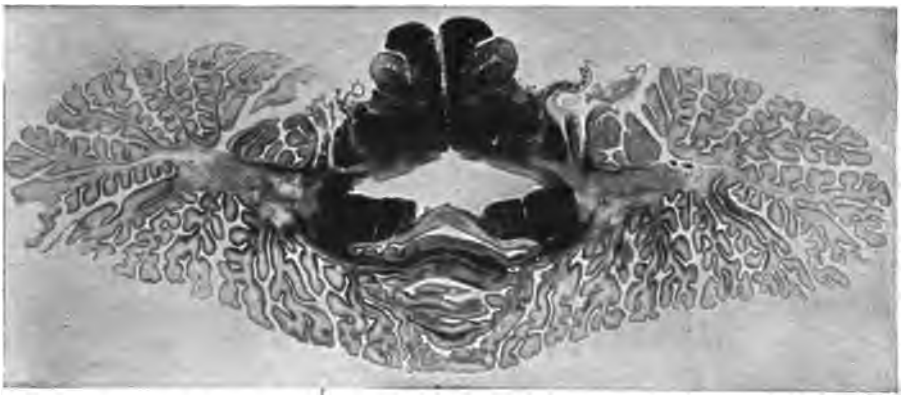
total degeneration of the middle cerebellar peduncle (Fig. 58). The superior cerebellar peduncle, which takes its origin in the dentate nucleus, was, on the other hand, relatively well preserved.



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FIGS. 56 and 57. Lesions of the cerebellum in a case of olive-ponto-cerebellar atrophy. Atrophy of the cortex and degeneration of the white substance. Integrity of the central gray nuclei and of the superior cerebellar peduncle. Atrophy of the medullary olives and the restiform body. (J. Déjerine and André-Thomas, *Iconographie de la Salpetriere,* 1900.)

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(3) A very pronounced atrophy of the inferior olives, of the accessory olivary nuclei, and of the arciform nuclei, and a degeneration of the external arciform fibers and of the restiform body. The pyramids and the cerebral peduncles appeared smaller than normal, but without any trace of degeneration.

The lesions of the cerebellar cortex were essentially characterized by the disappearance of most of the Purkinje cells.

Clinically the movements of the body as a whole were profoundly altered, whether they took place in the seated or in the upright position, whether the patient walked or passed from the seated position to a position lying down, or from a position lying

FIG. 58. Same case as Figs. 56 and 57. Atrophy of the anterior surface of the pons and the middle cerebellar peduncles.

down to a position standing. All these changes of attitude were executed with slowness, hesitation, uncertainty and awkwardness. A fall was sometimes the consequence of this disequilibration.

Upon rising the body was agitated by oscillations and the patient could not pass from the seated to the standing position without holding on to some neighboring object.

In the upright position the feet were spread wide apart, the base of support enlarged; the elbows were held in abduction and the body was the seat of either antero-posterior or transverse oscillations. The patient had the sensation that he was about to fall forward. Upright station with the feet close together was difficult, if not impossible.

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In walking the lower and upper limbs preserved the same position. The patient walked with caution as if seeking his equilibrium. Each foot was only lifted after hesitation, but then suddenly and replaced in the same manner. The steps were short and irregular and described a wavy line, because the body was carried either too far forward or backward, or to the side, and oscillated.

Summary.—There are no traces of the rhythm or of the cadence of the normal gait. Fatigue supervenes rapidly. The disturbances of station and of locomotion are hardly augmented by covering the eyes, consequently there was no Romberg sign.

The isolated movements of the upper and lower limbs, contrasted in their relative integrity with this considerable perturbation of equilibration.

In the upper limbs there was no trace of paralysis. Resistance to passive movements of flexion and extension was very great. The limbs could be stretched out, the forearm on the arm, the hands from the forearm and the fingers spread apart without any oscillation of the limbs or manifest trembling of the fingers. In spite of that, motility was not absolutely intact, when the patient seized or moved a heavy object she became awkward. The movements were slow and hesitating. When the patient tried to fill a glass the hand which held the bottle oscillated and poured the liquid to one side. The writing was shaky, the letters irregular and unequally spaced, and some of them unrecognizable, notwithstanding the characters were written slowly, the patient taking great pains to trace them.

Motility was not disturbed in the lower limbs; all the movements executed in bed were correct.

The limbs and segments of limbs could be placed in abnormal attitudes. Consequently there was no hypertonus. Sensibility in all its modes, superficial and deep, was intact. There was neither paralysis nor muscular atrophy.

The movements of the head were slow. The same slowness was found in the movements of the face (elevation of the lips, opening of the mouth, and the action of making a grimace). The physiognomy was almost without expression. The ability to mimic very slight. Neither the tongue or the palate were paralyzed. In spite of that speech was slow, drawling and slightly

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scanning. All isolated and synergic movements of the eyes were normally executed except elevation, which was done in several stages. This was rather a series of nystagmiform shocks than true nystagmus.

The tendon reflexes were exaggerated, but there was no sign which indicated a disturbance of the pyramidal tract (signs of Babinski, or of Oppenheim, epileptoid trepidation, etc.).

Similar phenomena were observed by the same authors in another patient, but without anatomical verification. I only cite them in comparison and not as evidence of equal value. The disturbances of equilibrium were of the same nature. They were exaggerated upon a change of attitude. In walking the patient gave the impression rather of having lost his balance than of walking like a drunken man. The upper limbs were awkward. "When the patient wished to seize an object, a glass, for example, he grasped too suddenly. When he tried to lift it to his mouth he hesitated a little, he was not sure of holding it well, and there were some small lateral movements which prevented the hand from accomplishing the desired object. The patient said himself that he was more awkward with his hands, and it very often happened that he upset objects at the moment of taking hold of them or carrying them." The same disturbances of speech, nystagmus and exaggeration of reflexes, etc., were found in him.

These observations, of which one was followed by a rigorous anatomical control, clearly show the influence of the cerebellum upon the equilibration of the body in general, and also upon the motility of the limbs. We will see further what physiological interpretation we may give to these various symptoms.

There exists in the literature a number of observations of atrophy of the cerebellum. It is to be regretted that one cannot give a collective description of them, but the observations are not sufficiently superposable to enable one to do so without reserve. One must be contented with an exposition of the facts; the facts are few, and in reading a résumé of some of those which are ordinarily cited as the most convincing, one will perceive that this chapter is far from being conclusive, at least, unless one sacrifice rigorously scientific methods, and is more content with impressions than with exactness.

In two other observations of olivo-ponto-cerebellar atrophy,

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followed by autopsies and reported in my thesis, I observed symptoms of the same type as in the preceding observations, but in one of these cases the columns of the spinal cord were only slightly degenerated, and in the other the degenerations were more extended, occupying the posterior columns, the direct cerebellar tract, and the tract of Gowers.

Pierret, Menzel, Royet and Collet, and Arndt, in their observations mention not only disturbances of equilibrium and gait, but also incoördination, or intention tremor. However these lesions were not exclusively distributed in the cerebellum and the parts dependent upon them: the bundles of the spinal cord, and more particularly the pyramidal tract and the posterior columns were partly degenerated (observations of Menzel and Arndt). The patient of Pierret had tremors of the arms, although the spinal cord was intact. In the patient of Royet and Collet the arms were affected by a slight tremor when in extension with the fingers spread apart, or when it was attempted to raise an object to the mouth; the objects were carried to their destination practically in a direct manner, but with some oscillation; but the anatomical examination does not appear to have been complete. In all of these patients disturbances of speech were noted, diversely described, according to the authors (embarrassment of speech, slow speech, hesitating, uncertain, etc.).

The observation of Fraser concerns a case of cerebellar atrophy, but unfortunately from the anatomical point of view it is very incomplete. Equilibrium and motility of the limbs were both compromised: "When one asked the patient to seize an object he acted like a choreaic, although to a less marked degree. After having seized the object he could hold it at arm's length without tremor or hesitation; asked to touch the end of his nose with his finger, he could do it almost as well as a normal individual, although he hesitated slightly."

The observation of Nonne has a more difficult interpretation. The atrophy of the cerebellum appeared to be due to an arrest of development. The encephalon was smaller than a normal encephalon. "The patient was able to dress himself alone but with such pains and so slowly that he was usually assisted. He was able to eat by himself also but not without spilling his food. It was particularly during attempts at writing that the disturb-

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ances of motility appeared. During walking the foot was lifted from the ground in an incoördinate manner, but he did not replace the heel first nor did he throw the legs forward like an ataxic."

The observation of Miura may be compared to that of Nonne. From the triple point of view—anatomical, clinical, etiological (in both cases heredity and family characteristics were found). The first symptoms appeared at the age of twenty-five. The gait became gradually uncertain; the body vacillated and described oscillations during walking; the hands were equally clumsy. When the patient was examined by Miura disturbances of gait and equilibrium, incertitude of the extremities in all actions, and visual disturbances were noticeable. Progression was not made in a straight line, the body was carried first too much to the right, then too much to the left, and sometimes even backward, so that he was threatened with a fall. The hands did not tremble, nevertheless, writing revealed great uncertainty and a manifest ataxia of the hands. With the arms widely separated the patient could touch his two index fingers together, as well with the eyes shut as with them open. Speech was explosive, badly articulated and scanning, sometimes hardly comprehensible. There was a slight horizontal nystagmus. In the upright position the legs were spread wide apart and the big toes in hyperextension; the body was animated with oscillations which were not much augmented by the closure of the eyes. The tendon reflexes were normal; the same was the case for deep and superficial sensation. On the other hand, there were serious disturbances of vision (diminution of visual acuity, the disks were injected and not well limited, and the pupillary reflexes to light and accommodation were sluggish).

At the autopsy the cerebellum was found to be small, only weighing 80 grams, the white and gray substances were less developed than in a normal individual, but they were well proportioned to one another. Compared to a normal cerebellum, the fibers of the white substance and their ramifications in the lobules and lamellæ were spaced further apart. But this was not all; the cerebro-spinal axis was smaller than normal. This reduction in size was particularly remarkable in the spinal cord. The cerebral convolutions, however, were also atrophied. The peripheral

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nerves were also degenerated. (The patient was at the same time affected with kakké, or beri-beri.) The two retinæ showed some lesions. One cannot, therefore, without reserve put down all these symptoms observed in this patient of Miura to the account of cerebellar atrophy.

In the patient examined by Schultze, there were besides the disturbances of equilibrium during walking and standing, disturbances of speech and traces of intention tremor in the arms, as well as nystagmus. The lesions consisted of an atrophy of the cerebellum affecting not only the cortex but also the dentate nucleus, which was very much compromised; besides, the medullary pyramids were slightly colored (method of Pal), and in the spinal cord the crossed pyramidal tracts were degenerated.

In some cases atrophy of the cerebellum presents itself in a more striking form. The atrophy does not affect equally all of the lobes, lobules and lamellæ; it affects irregularly certain lamellæ and other neighboring lamellæ may be absolutely untouched. In the affected lamellæ the cells of Purkinje completely disappear and are replaced by a thick felt-work of neuroglia.

In one of these cases which I have studied under the name of lamellar atrophy, the disturbances of equilibrium during the upright position were of a distinct character. The description is as follows: During walking the legs are spread wide apart, the base of support is very much widened, the toes are manifestly directed outwards, the arms are in marked abduction. The patient walks distinctly upon her heels, but she does not throw her legs forward like an ataxic. She does not follow a straight line, but describes, in walking, a broken one, the body being carried alternately too much to the right or too much to the left. In spite of that the general direction towards the goal is preserved. At the same time the body is constantly the seat of anteroposterior and lateral oscillations, and the patient constantly looks at the ground seemingly preoccupied in reëstablishing her equilibrium, or at least in avoiding the loss of it. The closing of the eyes does not sensibly augment the disturbances of equilibrium during the upright position or in walking, on condition that the feet remain spread apart; as soon as they are approached to one another she cannot stand upright, and as soon as the control of sight is suppressed she is threatened with a fall. She is also unable to support herself on one foot.

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FIGS. 59 to 61. Troubles of gait and equilibrium in a woman affected with lamellar atrophy of the cerebellum. Enlargement of the base of support. Abduction of arms. From an enlargement of an instantaneous photograph. (André-Thomas, *Revue Neurologique*, September, 1905.)

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The arms are not at all affected. Their muscular force and sensibility are intact. There is neither ataxia nor intention tremor. The olecranon and radial reflexes are normal. In contrast, the movements of the legs are irregular. They are accompanied by an intention tremor analogous to that of multiple sclerosis. This irregularity cannot be put entirely to the account of the cerebellar lesion. There is also a double club foot, the remains of an infantile paralysis, the lesion of which was easily found at the autopsy.

Two similar observations have been found by Rossi and Murri.

In the case of Rossi (followed by an autopsy), the cerebellar symptoms are mentioned. There was intention tremor of the arms, adiadochokinesis and asynergy of the legs (see page —). There was a manifest Romberg. But besides the cerebellar lesion Rossi noted lesions of the posterior column and of the posterior roots.

This very brief bird's-eye view of the pathology of the cerebellum suggests to us the following reflections: (1) Observations of primitive atrophy of the cerebellum are very rare; (2) they become exceptional if one only takes account of the observations in which the other parts of the neuraxis are absolutely healthy.

In the more clear-cut and typical observations, such as the one I published with J. Déjerine under the name of olivo-ponto-cerebellar atrophy, the symptomatology is confined to disturbances of motility. They are not due to paralysis or sensory disturbances; this is a fact upon which I have already insisted. It is above all equilibration which appears to be the most affected; during walking, during the upright position, and in all changes of attitude. The gait does not at all resemble the gait of a normal person, where the movements of the arms and legs and trunk are harmoniously related to one another; the compensatory movements necessary for the maintenance of equilibrium during the variations of attitude, are lacking or are imperfect. Thus, when a cerebellar patient descends a stairway, his body is thrown too far backward and he risks a backward fall. When he attempts to stand upon one leg, the body is carried either too much towards the side of the leg that is lifted or too much to the other side.

A patient of M. Babinski afflicted with a pontine affection in which, apparently, the cerebellar tracts participated, presented

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still more marked disturbances: During walking the trunk did not follow the legs. When a foot was carried forward, the trunk did not advance with it. M. Babinski classes this phenomenon in the group of asynergic phenomena. I have not yet observed this fact in the patients affected by cerebellar atrophy whom I have had occasion to examine.

There are, in cerebellar cases, other things than disturbances of equilibration. There is a general disorder of motility which appears in the execution of every act and movement; as well in writing as in speech (scanning), and movements of the eyes (nystagmus). In their observations Royet and Collet mention oscillations of the vocal cords. The patient has difficulty in holding a note. The reflexes are exaggerated.

Of what nature are these disturbances of motility? They have been differently interpreted according to various authors. They have been qualified as awkwardness, tremors, incoördination, etc. In the most typical observation which we published with J. Déjerine, the patient became awkward; when she seized a heavy object, or when she moved it, her movements were slow and hesitating; when she tried to fill a glass the hand which held the bottle oscillated and poured the fluid on one side. Another patient, the observation of which is very comparable to the preceding, had a certain awkwardness of the hands; thus, when she tried to take hold of an object, a glass, for example, she seized it too suddenly.

M. Babinski has insisted equally upon the excessive movements of those affected with cerebellar lesions. "If, for example, the patient carries the point of his index finger towards the end of the nose, which should be the terminal point of the finger after having followed its course in the desired direction, it does not stop when it has reached the object, but passes over it and violently strikes the jaw." As another example, he cites also the fact: "When the patient tries to trace a line on a sheet of paper, which should be stopped at a determinate point it is carried beyond this limit." Up to now M. Babinski has only observed this phenomenon, as have others also, as one related to disturbances of the cerebellar apparatus, where there is also an affection of the medulla and the pons and where the lesions are not localized exclusively in the cerebellum. In all of the autopsies which have

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been made, the lesions have been too wide spread and numerous to be attributed entirely to the cerebellum.

Recently, with Jumentié, I have had occasion to study more in detail these disturbances of motility in an individual very comparable by the ensemble of his symptoms with patients afflicted with olivo-ponto-cerebellar atrophy. In him the lack of the pro-

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FIGS. 62 and 63. Dysmetria in an individual probably affected with cerebellar atrophy. Exaggeraed opening of the hand to let go of a glass. The phenomenon is more marked on the left where the other symptoms predominate. (André-Thomas and Jumentié, *Revue Neurologique*, November, 1909.)

portion, the *dysmetria* noted by Luciani and other physiologists in animals deprived of the cerebellum, was very easily observable. When he was asked to place his finger upon his nose, the movement was executed differently according to whether it was spontaneous, rapid or slow.

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When the movement was executed spontaneously and naturally, it was done in several stages—it was not continuous. There was, so to speak, a certain degree of intention tremor. Also when the finger reached the nose, the hand was unstable and executed alternative movements of supination and pronation before reaching a state of repose; the tremor, therefore, was both kinetic and static. It will be studied further on. If the movement was made slowly and carefully, it was practically executed correctly, continuously, and did not extend further than it should have.

If the movement were rapid, the finger passed over the object and touched the cheek at the side of the nose; this time it was very clearly out of proportion, and there was dysmetria.

Dysmetria existed in all movements; if he tried to take hold of a glass the hand was opened too far (Figs. 62 and 63).

If the patient was lying down on the back, and he was asked to place the heel of one side upon the knee of the other side, the heel was lifted too high and passed by the knee, but was then replaced upon the knee. The patient, if he was standing and asked to raise his foot and then to put it down again, the foot was so replaced that the heel struck the ground, although the patient was held during this test in a manner to avoid any disturbance of equilibrium.

Dysmetria differs from peripheral ataxia by two fundamental characteristics: the complete or almost complete orientation towards the object, and the almost entire absence of the influence of sight upon the regulation of movement.

Babinski has already drawn attention to the disturbances of *diadochokinesis.* Diadochokinesis is the ability to execute rapidly successive volitional movements. Adiadochokinesis (Bruns) is the loss of this faculty. A cerebellar patient is not able to execute rapidly and regularly alternative movements of supination and pronation, or alternative movements of extension and flexion of the forearm upon the arm, etc., although the muscular force is preserved and sensibility is intact.

Adiadochokinesis has been noted by various authors in individuals afflicted with cerebellar affections (in the majority of cases they were tumors). It is mentioned by Italo Rossi in a case of parenchymatous atrophy of the cerebellum, and for the various reasons which we have enumerated above, observations

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of this order appear to us to have a great physiological importance.

According to Babinski adiadochokinesis would be the result

FIG. 64. Same patient as in Figs. 62 and 63. Gait of patient affected probably with cerebellar atrophy. Enlargement of the base of support. The gait is slow and uncertain. The right arm follows the left leg, but the inverse does not take place.

of the fact that each of these successive movements is not proportional (démesuré), and that the time lost between the two

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successive movements is not reduced to a minimum. There would seem to be some sort of delay in the excito-motor action. According to my opinion, dysmetria plays a considerable and even a preponderant rôle in the production of this phenomenon. Upon the patient to whom I have previously alluded I have been able to demonstrate the influence of dysmetria upon the difficulty of executing alternative movements of pronation and supination by the following test: When, after having directed the two arms forward, they having been put previously in extension with the palmar surface looking upwards, the patient turns them over, the movements of pronation are exaggerated on the left, and the left thumb is lowered further than the right one. A similar phenomenon is produced when the arm is put back into supination again, therefore, diadochokinesis is only present on the left side. On the other hand, when the patient has placed the arms in flexion or extension by a powerful contraction and he is asked to let them go, the decontraction is instantaneous and attains its maximum at once. In the same way with movements executed at command there is no delay in the volitional incitation. This is why adiadochokinesis seems to me to be only the consequence of dysmetria.

At the moment when the patient attempts to reverse the movement the initial movement is prolonged, and that is the reason of the delay.

The tremor of cerebellar patients is absent during repose. It occurs in two conditions: during the execution of voluntary movements and during the maintenance of an attitude, or rather, at the beginning of either of these conditions.

When the tremor is analyzed, as I have done in the case of the preceding patient, it is remarked that it is more apparent at the beginning of the movement. Instead of contracting in a continuous or tonic fashion, as in the normal state, the muscles contract in several stages. Interrupted and exaggerated shocks can be seen under the skin which recall to a certain extent those which are seen in the crises of epilepsy. The normal tonicity has given place in a way to clonicity.

The tremor is manifested also during the maintenance of an attitude. The patient takes, for example, a glass in the left hand, several brusque movements of pronation and supination are pro-

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duced before immobility is attained. This fact is still more marked if the glass is filled with water. In the same way, when the index finger and the thumb are approached one to another, one can see very clearly in the beginning clonic shocks in the first interossei muscles. The experiment may be varied by having the patient put the thumb and little finger in apposition. The results are identical. After a certain time the shocks disappear and equilibrium is obtained.

In this patient, therefore, the tremor is both static and kinetic. The static tremor hardly exists except at the beginning of an attitude.

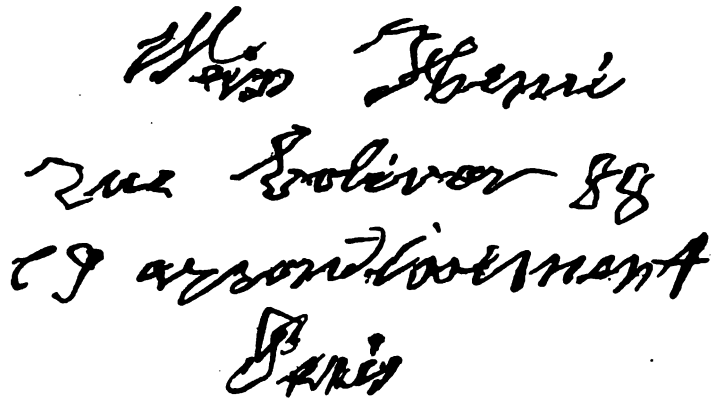

FIG. 65. Writing of same patient.

The tremor may be explained in various ways: (1) Either the movement is too brusque and disproportioned and the patient corrects it spontaneously by the intervention of the antagonist muscles; or (2) there are pauses and recontractions in the muscles.

According to my opinion, the antagonist muscles only play a small part in the production of this phenomenon. Their contraction can neither be perceived by the eye or by palpation; and they should be perceivable by one means or the other if they are sufficient to arrest the movement. It appears more probable that there are stoppages and recontractions of the muscles. In the normal condition every voluntary movement presents itself as the effect of a continuous contraction, a tonic contraction. The difference which exists between a healthy subject and one suffering from a

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cerebellar affection appears to be due, in great measure, to the fact that the volitional incitation which starts the movement is not prolonged in the last case into a tonic contraction.

The movement, therefore, is not only dysmetric but discontinuous (clonic or epileptoid), and these characters are found again in various physiological actions. In the speech, which is often explosive and scanning; in the writing, where the characters are irregular, the lines of unequal length and unevenly spaced and trembling. The intensity of the alterations in writing is attributable to the fact that the tremor is more accentuated at the beginning of movements or attitudes. That is why actions consisting of a succession of short and rapid movements are more compromised than others.

FIG. 66. Same patient. Model to the left, copy to the right.

Dysmetria and discontinuity of movement appear to us to be, after the disturbances of equilibrium, the fundamental characters of cerebellar affections.

Under the name of asynergia Babinski has described the loss of the faculty of association of movements.

(1) A normal subject placing his foot upon a chair bends the thigh upon the pelvis at the same time that he flexes the leg upon the thigh, a cerebellar patient first flexes the thigh upon the pelvis and then the leg upon the thigh. The two movements are not simultaneous; there is a decomposition of the movement. This first experiment does not prove asynergia unless the patient is seated or in a stable position, otherwise the decomposition of the movement could very well be nothing but a voluntary, calculated action, the patient behaving in this way because he is afraid of falling, and many ataxics do not act differently.

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(2) If one asks a normal subject who is standing upright to bend his body and his head backward, at the same time that he executes this movement he flexes slightly the leg upon the foot and the thigh upon the leg in a manner to avoid a fall backwards. In the cerebellar patients examined by Babinski this compensating movement of equilibrium was lacking, and if they were not held they fell backwards.

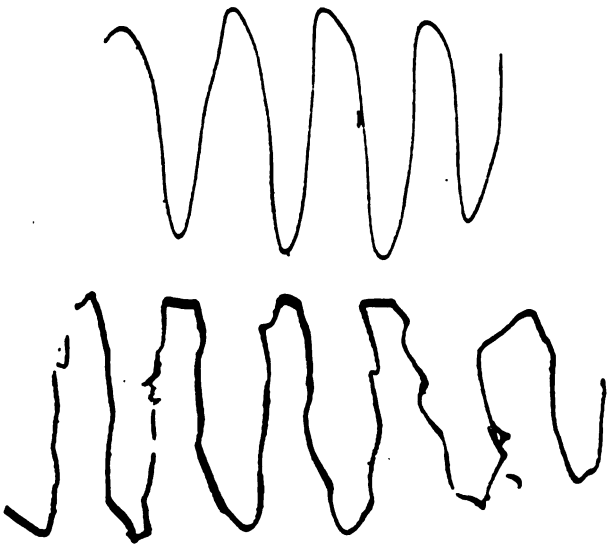

FIG. 67. Same patient. Model above, copy below.

(3) If the patient is asked when he is lying down in the dorsal position on a resisting plane to sit up, he cannot do it in a normal manner. The trunk is flexed a little upon the pelvis, but the thighs are flexed more upon the pelvis, and it is these that enable him to assume a sitting position. The results of these experiments are not constant. They are positive in certain patients and negative in others.

The backward fall (in the second experiment) did not occur in several patients that I examined. In some the movement was badly executed and accompanied by oscillations, but the patient did not fall. However, the patient in whom Babinski observed this fact in all its clearness was not a pure cerebellar case, as various associated symptoms enable us to affirm.

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Finally, the third experiment requires a more delicate interpretation. There are normal subjects who cannot sit up, or sit up with difficulty in these conditions, and in their repeated attempts they sometimes flex the thighs from the pelvis. It is necessary, therefore, that this movement of flexion of the thighs should be very accentuated to have real significance. I have formerly attributed these disorders of equilibration in cerebellar patients to asynergia without so calling it. I have remarked that during walking the movements of the arms do not associate themselves with those of the legs in cerebellar patients as they do in normal subjects. When a cerebellar patient descends a stairway the movements of projection of the trunk do not associate with the movements of the legs. The first have a retardation compared to the second. In the attempts to stand upon one leg, the body is inclined too much to the side, either to the right or to the left. As I have previously noted in my thesis, those movements which tend to displace the center of gravity do not provoke the tonic muscular reactions which assure the perfect maintenance of equilibrium. The loss of these reactions of equilibration in cerebellar patients is only in a certain way a manifestation of asynergia. Besides, in the experiments invented by M. Babinski, does not asynergia manifest itself by preference in those movements of the whole in which there is a question of equilibrium?

Babinski has also noted catalepsy in one patient (this patient was not a pure cerebellar type); that is to say, a tendency to maintain fixed attitudes for a longer time than a normal subject. Without catalepsy cerebellar patients would have the power to maintain fixed attitudes just as long as a normal subject. With a patient lying upon the back, the thighs flexed upon his pelvis, the legs slightly flexed upon the thighs, and the feet separated from one another when the patient raises his limbs both they and the trunk are affected at first by oscillations of large amplitude, and then at the end of some moments the body and the legs become fixed.

I have also noticed this phenomenon in a patient apparently afflicted with a cerebellar affection. When the patient is placed upon the back (this is the attitude of choice indicated by Babinski) with the thighs flexed upon the pelvis and the legs slightly flexed upon the thighs, the body is at first unstable, or oscillates

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around the longitudinal axis. The same thing happens in the case of the legs, which do not at first rest immobile, then the oscillations disappear and the patient can preserve, for a very long time, the same attitude. Occasionally one may note some very fine oscillations. In fact there does not exist at this moment any appreciable difference between that and what one sees in the case of a normal subject. The stability is in contrast with the oscillations which were produced at the beginning of the attitude. This is exactly what takes place in static tremor. What is true for the stability of partial movements is also so for the movements of equilibration. Cerebellar patients have a special difficulty in establishing stability or equilibrium promptly.

The movements of cerebellar patients are usually slow, but this slowness is not the immediate consequence of the functional insufficiency of the cerebellum, because they are able to execute rapid movements. The slowness is (apparently) willed, intentional, and has for its object the purpose of overseeing the movements and of combating more efficiently the tremor and the dysmetria.

Patients afflicted with cerebellar atrophy resist, generally sufficiently well, pushings and pullings which may be exercised upon them for the object of making them lose their equilibrium. I have never observed in them, or at any rate, to the same degree, a provoked latero-, antero- or retro-pulsion, so often seen in patients afflicted with Parkinson's disease.

In those patients whom I have examined on a turn-table in order to study their reactions to centrifuging, I have not been able to notice any appreciable difference between them and normal subjects.

IV. Lesions of the Cerebellar Peduncles in Man

The experiments made upon animals and the observations collected concerning the systemic or non-systemic lesions of the cerebellar paths, whether medullary or spinal, in man are comparable. Among these observations are some cases described under the name of heredito-cerebellar ataxia and of which the principal lesions are represented by the systemic degeneration of the direct cerebellar tracts and the tract of Gowers (André-Thomas and J.-Ch. Roux). The posterior columns are degenerated to a lesser

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degree, so that the disease assumes the clinical form very comparable to cerebellar affections (slowness of movements, tremors, oscillating gait, wavering, dynamic nystagmus). It borrows also some of its symptoms from Duchenne's disease (sign of Romberg, pains and disturbances of sensibility, etc.).

68 69

FIGS. 68 and 69. The various attitudes of the cerebellar gait, after enlargements from instantaneous photographs, in a woman affected with a focus of softening at the level of the left restiform body, and with two small foci of multiple sclerosis situated the one to the left in the central bundle of the tegmentum, the other to the right at the superior extremity of the facial nucleus behind the superior olive. These lesions are represented in Figs. 72 and 73. Disturbances of equilibrium, enlargement of the base of support, uncertainty of gait, abduction of the arms, particularly of the left one. (André-Thomas, *Revue Neurologique*, January, 1905.)

Certain medullary lesions give rise to symptoms which recall the unilateral and bilateral destructions of the cerebellum. Babinski and Nageotte observed a patient who presented hemi-

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asynergia of the left leg, latero-pulsion towards the left and a slight tremor of the arms. (There existed also a slight hemiplegia with right hemi-anæsthesia, difficulty of swallowing, and a slight contraction of the left pupil.) A histological examination

70 71

FIGS. 70 and 71. The various attitudes of the cerebellar gait, after enlargements from instantaneous photographs, in a woman affected with a focus of softening at the level of the left restiform body, and with two small foci of multiple sclerosis situated the one to the left in the central bundle of the tegmentum, the other to the right at the superior extremity of the facial nucleus behind the superior olive. These lesions are represented in Figs. 72 and 73. Disturbances of equilibrium, enlargement of the base of support, uncertainty of gait, abduction of the arms, particularly of the left one. (André-Thomas, *Revue Neurologique,* January, 1905.)

of a series of sections showed the presence of multiple softenings in the left half of the medulla and the fibers of the restiform body had been partially divided. An analogous symptomatology is encountered in cases of tumor of the cerebello-pontine angle, that

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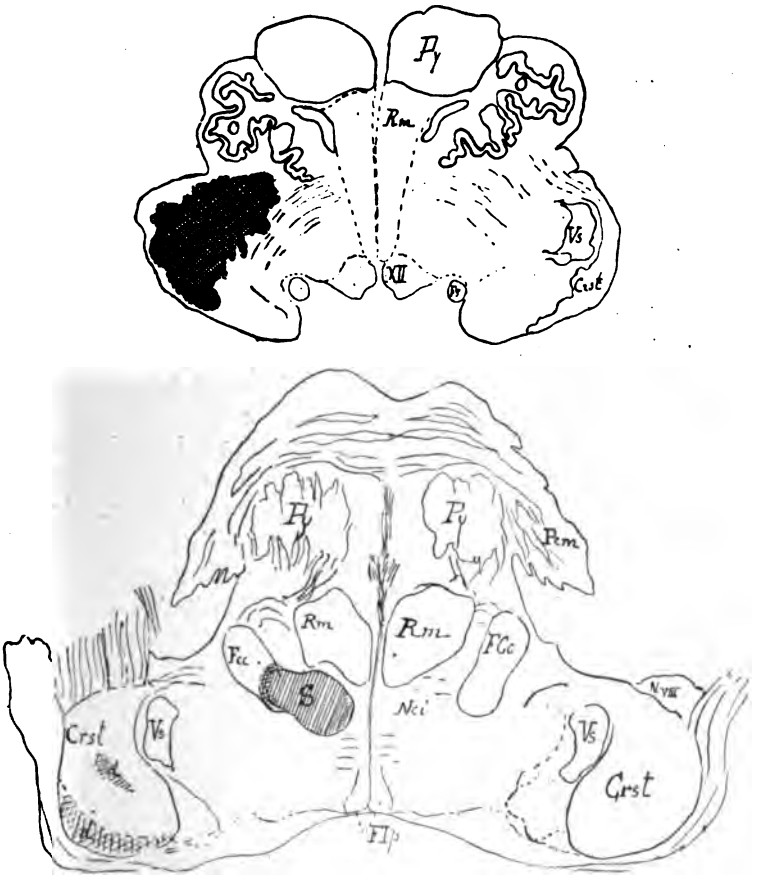
is to say, those which are developed in the angle formed by the pons and the cerebellum. These are very complex cases: firstly, because it is a question of tumors which compress at the same time the cerebellum, the middle cerebellar peduncle and the pons,



FIGS. 72 and 73. Lesions of the medulla giving occasion to the disturbances of gait represented in Figs. 68 to 71.

and also because the vestibular nerve is usually likewise affected. Consequently the coëxistence of functional disturbances of the vestibular nerve or its central paths contributes towards augmenting considerably the disturbances of equilibrium present. In

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a case of softening of the medulla oblongata, located at the union of the inferior third with the superior two thirds of the left half in the lateral reticulated substance (encroaching upon the inferior extremity of the restiform body), and associated with a patch of sclerosis upon the pathway of the central bundle of the tegmentum, I have observed disturbances of motility comparable to those of the cerebellum. The attitudes represented in Figs. 68 to 71, which are enlargements from photographic plates, give better than any description an idea of the intensity of the disturbances of equilibrium. Perhaps in this case there is occasion to take into consideration the interruption of other fibers than cerebellar fibers, particularly those of the descending root of the eighth pair (vestibular fibers). The same consideration is applicable to the experimental section of the restiform body which compromises almost always the anatomical and physiological continuity of the same root.

Lesions of the tegmentum often give rise to a permanent or intention tremor of the limbs on the side opposite the lesion. This tremor is very similar in certain cases to the intention tremor of multiple sclerosis (an affection in which the superior cerebellar peduncles are frequently the seat of pathological foci). It is a part of the syndrome of Benedikt, which consists of a paralysis more or less complete of the third pair, with a slight crossed hemiplegia, associated with tremor, and which is due to a lesion of the tegmentum involving to a variable degree at the same time with the root, or the nucleus, of the third pair, the superior cerebellar peduncle or the region of the red nucleus. Lesions also of the cerebellar olive, or of the superior cerebellar peduncle, have been noted, which have caused disturbances of motion, recalling at the same time chorea and the intention tremor of multiple sclerosis.

All these facts are allied to the intention tremor observed by Ferrier and Turner in the monkeys in which they divided the superior cerebellar peduncle.

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PART SECOND

INTERPRETATION

After having set forth the results of experimental physiology and clinical observation, it is well to pass in review the various interpretations of the several authors to explain the mechanisms, that is to say, the divers theories propounded as to the functions of the cerebellum. The theories of a purely hypothetical nature will only be mentioned. Only those should be retained and discussed which are based upon the findings of clinical and experimental physiological observation. I will afterwards endeavor to make an impatrial criticism, appealing only to positive facts, and reducing to a minimum the rôle of hypothesis, which, in spite of everything, is inevitable in a question of a purely doctrinal order.

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CHAPTER VI

THE CEREBELLUM AND THE ORGANIC FUNCTIONS

One might expect that the discussion would be limited to a very restricted series of facts and would not have reference to anything except the mechanisms of the recorded phenomena. However, there is far from being an unanimous accord as to the facts themselves, and if one takes into consideration all of the theories that have been propounded, one can say that there is no function of animal life, or of the life of relation, into which the cerebellum does not intrude.

Willis has maintained that the cerebellum is not foreign to the organic functions and to the involuntary movements, meaning by these last expressions not only automatic or reflex movements, but those of animal life, the beatings of the heart, respiration, digestion, etc., etc. The intervention of the cerebellum in the glandular and visceral functions has been accepted by some great physiologists, who bring to bear the results of various experiments. Claude Bernard stated that he stopped the secretion of the crop in pigeons by wounding the cerebellum, that the excitation of the cerebellum would produce movements in the bladder, in the stomach, and in the intestinal canal. According to Dugès, its intimate relations with the pneumogastric nerve cause it to intervene in respiration and digestion, in the complex instinctive phenomena, in acts relative to the sustaining of life, in the appetites, and in the necessity of breathing.

Likewise, according to different authors, the sexual instinct and the genital functions are located in the cerebellum. Goll was the principal protagonist of this theory. He made the cerebellum the organ of the instinct of propagation or of the inclination to physical love. To the support of this hypothesis he invoked the following arguments: Persons of a very ardent temperament feel a tension and a sensation of heat in the back of the neck, particularly after excessive and profuse emissions or after prolonged continence. In rabbits deprived of a testicle the lobe of the cere-

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bellum on the opposite side from the removed testicle is smaller and the corresponding occipital boss is more flattened than the other. Females have a cerebellum smaller than males because the sentiment of physical love is less pronounced in them, and finally, the complete development of the cerebellum coincides with that of physical love. All of these propositions are in disaccord with reality; there is no appreciable difference in the cerebellum of males and of females. The development of the cerebellum is completed a long time before the appearance of the genital instinct. Castration does not in any way involve the atrophy of the cerebellum (Leuret and Lelut).

It is known what the physiological works of Goll were worth. He had, however, his partisans, and his ideas seem to be confirmed by some physiologists of talent. Budge and Valentin are said to have provoked, by the direct stimulation of the cerebellum, movements in the vesiculæ seminales, the testicles, the Fallopian tubes and in the uterus. Spiegelberg obtained uterine contractions by mechanical or chemical irritation of some one or other region of the cerebellum; the vesicular turgescence, the cause of erection, could be produced according to Ekhard by an irritation of the pons. Thion reports the autopsy of a cow which had a calf without lactic secretions having been produced, and which later would not allow the approaches of the male, and in which he found a number of tubercles in the cerebellum. Serres has reported seven observations of apoplexy of the median lobe, in which there was priapism and exaltation of the feeling of physical love, and he concludes from this that the vermis is the excitor of the organs of generation.

All of these facts have only the value of simple coincidences and have not been established with the control and scientific rigor necessary; besides, they may be opposed by contradictory facts of which the conclusions are more significant. Flourens maintains that the cerebellum does not intervene in any way in the instinct of propagation or of physical love, and he bases this upon the following fact: A cock from which he had removed the greater part of the cerebellum attempted to mount the hens, but he was not able to do so on account of his disequilibration, and this great physiologist adds "his testicles were enormous." Since then the majority of physiologists have observed that the destruction of

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the cerebellum does not interfere in any way with the manifestations of the sexual instinct except by the difficulties that are introduced towards the maintenance of equilibrium or of attitudes.

The animals operated upon by Luciani had polyuria, glycosuria and acetonuria. This Florentine physiologist attributed these phenomena to action upon the neighboring fourth ventricle. In the same way emaciation, alopecia and the various dystrophic disturbances are not attributable directly to the lack of cerebellar innervation; they are indirect and inconstant effects.

Influence of the Cerebellum on Development and Growth

The cerebellum does not appear to have any influence upon the development of the body and upon growth. In the cases of destruction of one half of the cerebellum in young dogs aged from fifteen days to three weeks, I was not able to observe any difference between the two sides of the body. Certainly when these animals are compared to other dogs of the same litter it is observed that their growth is less rapid (Borgherindi and Gallerini, and André-Thomas). The operative shock and traumatism are seemingly the principal cause of this. However, Russell observed a cat in which the right lobe was only about half the size of the left lobe. This atrophy was manifested during life by an accentuated paresis of the two extremities of the right side, and the right paw was a little shorter than the left. But was this partial agenesis of the cerebellum really the cause of the retardation of the growth of the corresponding limb? One can well doubt it, since, in the various observations of agenesis of the lateral lobe in man, no similar asymmetry has been mentioned.

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CHAPTER VII

THE CEREBELLUM AND SENSIBILITY

The relations of the cerebellum to sensibility have been variously estimated. Admitting such relations some authors base their conclusions upon anatomical facts, some upon the results of physiological experiments, and others upon clinical observation.

In the domain of sensibility there are generally distinguished general sensibility and the special sensibilities (hearing, sight, smell and taste). The relations of the cerebellum to sensibility should be studied from this double point of view.

The Cerebellum and General Sensibility

Lapeyronie and Pourfour du Petit base their conclusions upon clinical observations; Saucerotte, Foville and Pinel-Grandchamp on the results of their physiological experiments, and conclude that the cerebellum is an organ eminently fitted to the sensory function.

Foville and Pinel-Grandchamp even recognize a sensibility peculiar to the cerebellum. Dugès, considering that the cerebellum receives in its hemispheres the sub-spinal bundles of the spinal cord, looks at the cerebellum as an organ belonging to general sensibility; it would preside also over taste and hearing, owing to its relations with the glosso-pharyngeal, trifacial and auditory nerves.

The deep sensibilities and the muscular sense will be considered later on. Only the sensibilities to contact and pain will be considered here. According to Luciani, sensibility to contact is respected. He has noted that if one touches the animal while he eats, or while he has his eyes bandaged, he reacts by a movement which indicates that he has felt. Russell maintains, on the contrary, that the destruction of one half of the cerebellum is followed by an anesthesia and an analgesia of the same distribution as the motor paresis, that is, localized in the two limbs on the side of the lesion and the posterior limb of the other side; the

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total destruction of the cerebellum entails an anesthesia and an analgesia of all four limbs.

Regarding sensibility, however, clinical observations appear to me to have more value than physiological experiments. In an animal, sensibility is always difficult of exploration and one cannot judge as to its conservation or alteration except by reflex acts. Atrophies of the cerebellum exclusively cortical or generalized do not give rise in man to any disturbance of sensibility, either superficial or profound.

Besides, the proximity of the nuclei of the posterior columns and of the cerebellum allow one to suspect that they have been compressed by blood clots following the experimental destructions. It is perhaps through this mechanism that one must explain the sensory disturbances noted by various authors; besides, they are transitory and only last a few days (Russell).

The Cerebellum and the Special Sensibilities

Among the special sensibilities hearing is the one which one most willingly localizes in the cerebellum. Treviranus has already established a relation between the degree of development of the organ of hearing and that of the cerebellar hemispheres on one side and between the vermis and the trifacial on the other side. The macroscopic relations between the eighth pair and the bulbo-pontine angle are of a nature to justify this hypothesis. Today it is known how little faith we must put in the findings of topographical anatomy. One can only obtain a knowledge of the relations between the different parts of the neuraxis based upon secondary degenerations in man and animals.

The eighth pair is formed from two roots. One takes its origin in the cochlea, that is, the cochlear or auditory root. The other, which originates in the semicircular canals of the vestibule and saccule, is the vestibular root, or the vestibular nerve. The cochlear root serves exclusively for the transmission of sound waves and terminates in the ponto-medullary nuclei, the ventral auditory ganglion and the acoustic tubercle, and does not contract any relation, direct or indirect, with the cerebellum. The vestibular root is of more interest to us: First, because some of its fibers, at least in animals, terminate in the nucleus of the tegmentum, second, because almost all of its fibers arborize around the

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cells of three nuclei (nucleus of Deiters, nucleus of Bechterew, and the triangular auditory nucleus), which are themselves in intimate relations with the cerebellum. The study of a microscopic series of sections of the medulla, the pons, and the cerebellum, show, in effect, that there exists between these nuclei and the central nuclei of the cerebellum, an important anatomical connection, represented by the internal and external semicircular fibers. Secondary degenerations show besides, that after destructions of the vermis, lesions of the vermis and of a hemisphere, the degenerated fibers can be followed to the nuclei of the vestibular nerve; on the other hand one cannot affirm that any fibers which go to the cerebellum come from these nuclei.

One cannot, therefore, affirm that the cerebellum is a center for the storage of peripheral excitations gathered by the vestibular nerve, and, consequently, a center of perception for this class of impressions.

The most that one can say, based upon the existence of some vestibular fibers which go directly to the nucleus of the roof, is to admit with Stefani that the cerebellum utilizes impressions which are furnished by the terminations of the nerves of the eighth pair to regulate the attitude of the head in space.

The fact that in cerebellar patients there is no disturbance of the compensatory reactions of the head and eyes, nor of the perceptions of movements of rotation on the centrifugal apparatus, may be cited still further against the opinion of those authors who make of the cerebellum a center of perception of vestibular impressions. Spontaneous vertigo does not enter either into the symptomatic picture of cerebellar atrophies, at any rate, if it is not foreign to certain phenomena produced by experimental lesions of the cerebellum (Vulpian and deCyon), it does not play any except a very minor rôle in the pathological physiology of the disorders of equilibration.

But one must admit that the cerebellum exercises some action upon the medullary nuclei of the vestibular nerve. Since these nuclei, the nucleus of Deiters and the nucleus of Bechterew, contain cells the axis cylinders of which, after a more or less complicated course, terminate in the nuclei of the third and the sixth pairs, and in the gray substance of the anterior horn, they represent important reflex centers.

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The posterior longitudinal fasciculus is the principal path followed by these fibers. The relations of each nucleus of Deiters-Bechterew are principally crossed for the third pair and direct for the spinal column.

It is established, on the other hand, that the cerebellar fibers which terminate in the nuclei of the vestibular nerve are derived from the central nuclei (principally the nucleus of the tegmentum), and as these last named nuclei receive in their turn fibers of projection from the cortex (and more particularly from the region of the vermis), it results that the vermis is the territory of the cerebellar cortex, of which the functional activity is the most intimately connected with that of the nuclei of the vestibular nerve.

I will discuss later the importance of these anatomical relations in connection with the various hypotheses which have been given out on the physiology of the cerebellum.

The cerebellum does not play any rôle in the perception of visual, gustatory, or auditory sensations.

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CHAPTER VIII

THE CEREBELLUM AND INTELLIGENCE

It is apparent that in order to study the rôle of the cerebellum in the elaboration of psychic processes, it is necessary for one to address oneself to the highest individual from the intellectual point of view in the animal series, that is, to man. The anatomo-clinical method shows itself here superior to the method of experimental physiology.

While it is true that in a sufficiently large number of observations the coincidence of intellectual disturbances with cerebellar lesions has been noted, how many times has a relation of cause and effect been established in a rigorously scientific manner between the two? Those who have thought that they have found this relation have not taken into consideration the possibility of the coëxistence of cerebral lesions, or the insufficiency of the examination of the cerebrum. Courmont, who has consecrated a large volume to the study of the functions of the cerebellum, has not been able to avoid this objection. He has utilized for the support of his doctrine—for him the cerebellum is the organ of psychic sensibility—observations in which there existed at the same time cerebellar and cerebral lesions.

With this preconceived idea as a point of departure, he chose the rat as the subject of his experiments, because, said he, "it is very impressionable." In the rat deprived of the cerebellum he examined the modifications of the five modes of expression of the emotions of the animal: "The attitude, the gesture, the jump, the flight, and the cry." After the operation, the animal assumed an indifferent attitude; he did not spring away; at each noise which startled him the jump was not the same. "There was no more any modality, there was a simple reflex movement; there was no tendency to flight, or if there was, it was slow and apathetic; the psychic cry did not exist." Among these disturbances some may be explained by disorders of motility, others by the traumatism, or the shock of the operation, and there is nothing

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to prove that they were the consequence of any psychic disorder.

According to Luciani monkeys appear to have their natural timidity exaggerated; in dogs, during the first few days that follow the operation, there seems to be an increase of their affectionateness. Later they are lazier and more apathetic. In this there is nothing that indicates a serious perturbation or suppression of psychic sensibility.

Patients afflicted with cerebellar atrophy are usually slow in their acts and in their reactions, and that is easily explained by the disturbances of motility and of locomotion. The apparent asthenia is caused seemingly simply by the suppression of an organ, which permits, in a sort of reflex manner, the play of all the mechanisms adapted to the perfect execution of movement, and which permits the cerebral activity to dispose itself almost entirely in the elaboration of psychic processes. As one will see further on the cerebrum supplies, in a large measure, the insufficiency or the absence of the cerebellum. If a man is obliged to exercise his will and to constantly oversee his equilibrium, his attention would be distracted from phenomena purely psychic, and this would be at the expense of the development and the upkeep of his intelligence.

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CHAPTER IX

THE CEREBELLUM AND MOTILITY

The most striking phenomena observed in animals where the cerebellum has been totally or partially destroyed, and in man affected with cerebellar lesions, are above all disturbances of motility. This is the almost unanimous opinion both of physiologists and clinicians. The same unanimity is lacking when it is a question of interpreting them. For some the cerebellum is a center of energy, or reinforcement of muscular tonus; for others a center of coördination, and for still others its rôle is much more limited, it is a center of equilibration. As a center of coördination its rôle has been variously interpreted. For some authors it is intimately connected with the perception of deep sensation and therefore the center of muscular sense; the majority, however, consider that it does not contribute in any way towards the perception of sensations. This hypothesis will be discussed first, as it is of fundamental importance to know whether or not the cerebellum is a center of perception and of sensory impressions.

The Cerebellum and the Muscular Sense

Magendie had already considered the cerebellum as the center of muscular sense. Lussana and Lewandowsky are the principal protagonists of this theory.

According to Lussana the cerebellum is the central organ of the muscular sense, and he considers the posterior columns as the organs of transmission (this is an error, since the contingent of fibers of the posterior columns which terminate in the cerebellum is extremely small; several anatomists even deny their existence). According to this author the coördinating innervations from the two sides of the body unify and lose themselves in the cerebellum, and it is from this resultant that is deduced the appreciation of the center of gravity of the body and its various parts in their movements so complex and their functions so varied. The fibers of the spinal cord which terminate in the cerebellum

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bring to it the notions of space, of touch, and of pressure. It coördinates in this manner voluntary movements adapted to translation of the body, in the same way that a coördination of language and the movements of the face are made in the olives, and the movements of mastication and of the mouth are made in the medulla oblongata. The cerebellum contains also the centers for the coördinating movements of the eyes. The ataxia strikes in animals the thoracic limb because in animals the center of gravity is nearer the thorax; for the same reason it predominates in the lower limbs in man.

The works of Lussana have contributed to throw light upon the functions of the cerebellum in their relations to equilibration and the coördination of movements, but he has shown no experiment which was of a nature to prove that the cerebellum is a center of perception of muscular sensations and of deep sensations in general. Besides, it is only in man that it is possible to study this type of perception, as it is with every form of conscious sensation.

The theory of Lussana has been taken up again recently by Lewandowsky. He invokes to the support of his thesis some phenomena which do not lack interest.

According to Lewandowsky "each motor disturbance following a cerebellar lesion is accompanied by disturbances of the muscular sense." To the support of this theory he cites certain abnormal attitudes and certain disturbances of locomotion. Among the attitudes he insists upon that of the fore paw during repose (on the same side as the lesion, if the lesion be unilateral), often it does not lie upon the plantar but upon the dorsal surface. In the same way if the animal is lying down in the abdominal decubitus upon a table, and if the paw (on the side of the lesion) hangs over the table, the animal does not draw it back, whereas a healthy animal always does. The hindquarters may be hung over the edge of the table and the animal does not make any effort to draw them upon the table.

The motility of the isolated movements of the limbs is also disturbed. For instance, a dog wishes to seize a bone with its paw, very often the paw passes over it. The majority of physiologists have noted that during walking the paws of the dog are lifted too high. Lewandowsky has noted the same fact in other

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animals. In some other animals, on the contrary, the paws are not lifted high enough; in the first case he compares the gait with that of a cock, in the second with that of a cat. Not only is the amplitude of the movement exaggerated, but it is also too rapid. When the dog reëducates itself and commences to walk, the members of the side operated upon are lifted and replaced too suddenly; the phenomenon is particularly marked during running.

Luciani has also mentioned that the hand of the monkey (on the operated side) is less active, it takes hold of food in a different manner. A similar fact has been noted by Lewandowsky; the movements of prehension are abnormal, the animal seizes an object to one side, or too close to him, or too far away, and he cannot easily hold it in his hand. The disturbances of the appropriateness of the movements is seen even when the monkey tries to climb; he seizes the bar between the third and fourth fingers.

Synergy does not appear to be disturbed; it is not only direction that the animal has lost, but also the chronological sense of its muscular contractions. "Cerebellar ataxia is a sensory ataxia which depends upon a grave disturbance of the muscular sense entailing a loss of the power to graduate the movements, and regulate the proportional force, the rapidity and the succession of muscular contractions either isolated or synergically united: the movements take a marked character of non-appropriateness. . . ." Lewandowsky goes further: The cerebellum is not a stranger to the perception of superficial excitations. "The loss of the reflex of contact indicates a disturbance of cutaneous sensation."

The observations of Lewandowsky have been partially contested by H. Munk. According to his own observations (and contrary to those of Lewandowsky), the monkey only exceptionally seizes the bars of his cage in an abnormal manner. He recognizes that the dog does not always correct the vicious attitudes of his body, or at least corrects them more slowly than he normally would, nevertheless when these attitudes have been artificially produced (as Ducceschi and Sergi have noted), the correction is sometimes made in a normal manner, and at other times with a notable slowness; often also, it is true, that they are only incompletely made. These same authors also insist that this phenomenon is produced not only on the side of the operation, but also on the healthy side. They note only that the correction is

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slower on the operated side. Besides, when the animal commences to walk one is more rarely able to impress upon the limbs these abnormal attitudes.

To sum up, these abnormal attitudes or positions exist; the interpretation of them is more delicate. Lewandowsky attributes them to a loss of the perception of the right or wrong position of the limbs and this interpretation at first sight seems quite logical. However this may be, the lack of, or the slowness in, the correction of these abnormal attitudes attenuates or disappears with time, and it is difficult to attach to this temporary sign a definite loss of the muscular sense. May not the lack of correction of these vicious attitudes be occasioned by the feeling of uncertainty and the tendency towards inertia on the part of the animal? The animal is conscious of its awkwardness and during the first days following the operation avoids moving.

A more serious criticism has been made of Lewandowsky's position—which has nevertheless contributed to throw light upon the disorders of the isolated movements of the limbs, but in which he is possibly wrong, to deny those of synergy—that is, to have too much neglected, as also has Lussana, clinical observations. For in patients affected with cerebellar atrophy, disturbances of deep sensation are altogether lacking. Up to the present no one has noted any perturbation comparable to that observed in the affections of the optic thalamus, that is to say, in the thalamic syndrome (J. Déjerine and Egger, Roussy). One can also reproach him with having envisaged the cerebellar ataxia as a grave disturbance of the muscular sense and having hesitated as to the conscious or unconscious nature of this sense. What is an unconscious sense or sensibility anyway?

One cannot deny, however, that the peripheral excitations which originate in the trunk, or in the limbs, have a part in the mechanism of the cerebellum. These excitations are transmitted to the cerebellum through the intermediation of the direct cerebellar tract and the tract of Gowers, as noted, and section of these bundles gives rise to symptoms which have some resemblance to those which follow a destruction of the cerebellum (Bing). But these excitations are not *perceived* by the cerebellum.

On the other hand, the cerebellum receives through the inter-

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mediation of the pontine nuclei, the crura cerebri, and the middle cerebellar peduncles, a large number of impressions, which for the most part, are derived from the sensory-motor zone of the cerebral cortex. The cerebellum therefore stores up impressions which come to it either directly from the periphery (spinal and restiform paths), or indirectly after having been subjected to a representation or an elaboration, from the cerebral cortex. Mann, who considers the ataxia as one of the principal cerebellar symptoms, does not differentiate it in any way from the peripheral ataxia or the tabetic ataxia. In the two cases the ataxia is due to the lack of or the suppression of peripheral excitations which originate in the muscles at the moment of their contraction. These indices of muscular innervation would normally be recorded in the cerebellum and rest below the threshold of consciousness. Mann remarks that in fact the execution of movements does not give rise to conscious sensations of articular displacements, and is not accompanied by conscious sensations of muscular contractions; this is why cerebellar ataxia is not accompanied by any apparent disturbance of sensibility. The same can be the case in peripheral ataxia.

This conception will have to be slightly modified if certain phenomena, to which Lotmar has recently drawn attention, should again be noted in cases of lesions strictly cerebellar. In two patients presenting a clinical syndrome very comparable with that of cerebellar lesions (in one case it was a question of cerebellar apoplexy, and in the other a lesion of the tegmentum of the crus cerebri affecting the superior cerebellar peduncle), Lotmar observed a disturbance of deep sensibility consisting of a defect in the estimation of weight.

The weights were contained in a pasteboard box and placed in the hollow of the hand, the two elbows being symmetrically supported, and the forearm in supination; the patient was told to estimate the weight in the right hand in comparison with that in the left by slowly weighing them in the hands. On the side of the cerebellar hemi-ataxia the weights were estimated below their real value; on the other hand the notions of displacement, position and sensibility to pressure and stereognosis were intact. Making every reserve as to the location of the lesions, which was

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not verified by an autopsy in either of these cases, Lotmar concludes that the cerebellum should be envisaged as a central organ, and as a relay station, not for all modes of deep sensation, but for those excitations which result in variations of tension in contracted muscles.

Hitzig has expressed a very similar opinion: The cerebellum with the subcortical organs, which are annexed to it groups the peripheral impressions coming from various sources, forms of them representations of an inferior order which it then transmits as a whole to the cerebrum. This alone would be capable of utilizing the impressions as a whole, but it would not be able to penetrate into each unit of these impressions, which would rest below the threshold of consciousness. The cerebrum has a different action from the cerebellum in the sense that it delivers conscious intentional impulses, which are divided afterwards by the cerebellum for each particular motor center.

To sum up: It has not been demonstrated that the cerebellum is an organ of perception for deep sensation which is currently designated by the name of "muscular sense." It is legitimate to admit, however, that it utilizes the oscillations of nervous flux which take their source in the displacements of the deep parts, and the variations of muscular contraction or tonicity.

As to cerebellar ataxia, it is, in my opinion, in no way identical with tabetic ataxia. Not only is the disturbance of tonicity not the same in the two cases, but they differ from one another by the absence of disturbances of deep sensibility in the first, and by their extreme frequency, not to say constancy, in the second. The observations upon which Mann bases his contention are for the most part observations of a complex nature, and in which the lesion has interrupted other than purely cerebellar paths.

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Are the Phenomena Observed After Total or Partial Destruction of the Cerebellum, all of the Same Order? Is there Reason to Distinguish Between the Immediate Irritative Phenomena and the Later Ones Due to the Imperfection or Lack of Cerebellar Innervation? The Cause of the Movements of Rolling or Rotation.

The partial or total experimental destructions of the cerebellum determine, according to Luciani, two types of phenomena: (1) Immediate phenomena due to irritation. (2) Subsequent phenomena due to imperfection or lack of cerebellar innervation.

The phenomena considered by Luciani as irritative phenomena are the following:

(1) *Unilateral Destruction.*—Pleurosthotonus, or the incurvation of the vertebral arc towards the side operated upon, associated with the tonic extension of the forward limb of the same side (in the dog), and with clonic movements of the three other limbs. A contortion of the vertebral axis in a spiral fashion, principally in the cervical region, towards the healthy side, associated with strabismus and unilateral (sometimes bilateral) nystagmus (deviation of the eye of the side operated upon, inwards and downwards, and of the other eye outwards and upwards). A tendency to rotation around the longitudinal axis according to the direction of the torsion and the strabismus, that is, from the operated to the healthy side. These movements are not constantly produced except during the first days, they do not become exaggerated the following days except when the animal is approached or excited, or when it attempts to walk.

(2) *Total Destruction.*—Incurvation backwards of the vertebral column in the form of opisthotonus, tonic extension of the two forward limbs with clonic movements of the hind limbs and bilateral convergence of the eyeballs. A tendency to draw back and fall backwards. These symptoms are at first continuous, afterwards they do not arise except intermittently when the animal is excited, or when it attempts a voluntary act.

In both cases (partial or total destruction), we must add to the irritative phenomena: Agitation, restlessness, and the frequent whining of the animal.

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This shows, according to Luciani, that these phenomena depend upon irritation of the efferent fibers which compose the cerebellar peduncles, that is, that in an animal which has been subjected to an extirpation of the median lobe of the cerebellum some time back, and in which many of the fibers of these peduncles have undergone degeneration, and consequently lost their excitability, if then a hemisphere is removed, the phenomena are of a much lighter character and more evanescent than if the operation had been made in one stage upon another animal.

This interpretation is very debatable, and the diminution in the intensity of the so-called immediate phenomena, after the second operation, can be just as well explained by a certain habituation and by cerebral substitution upon which Luciani has so rightly insisted, to account for the reëducation of the animal deprived partially or totally of the cerebellum.

Luciani has devoted a long and critical study to the movements of rolling or rotation around the longitudinal axis described for the first time by Parfour du Petit, and observed by Magendie, Lafargue, Schiff, Longet and Vulpian.

Physiologists have been for a long time in disaccord as to the direction of the movements which follow lesions of the cerebellum, or of the cerebellar peduncles, possibly because they have not agreed sufficiently well as to the manner of describing the direction of rotation.

According to Magendie the rolling takes place from the healthy side towards the side operated upon; according to Longet, in the opposite direction. Schiff has attempted to explain these contradictory results by the difference in the technique of the authors in doing the operations. Magendie appears to have sectioned the inferior peduncle of the same side; Longet not only sectioned a cerebellar hemisphere but also the inferior cerebellar peduncle of the opposite side (which he wrongly considered formed of crossed fibers in the white substance of the cerebellum). Schiff has brought to light another fact of great value. He observed that if the rabbit (it was upon this animal that he made the demonstration) is left free at the moment of section of the peduncle, he executes at first two or three rolling movements from the operated side towards the healthy side, and afterwards a whole series of movements in the opposite direction;

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the first movements would be due to irritation and the second to paralysis. Section of the middle cerebellar peduncle would place an obstacle to the passages of the voluntary influx to the muscles of the vertebral column of one side.

Contrary to the hypothesis given out by Serres and Lafargue, the limbs would not play any part, or at least any prominent part, in the production of the phenomenon because it takes place just as well when the posterior limbs are immobilized or paralyzed by section of the sciatic nerve. Nevertheless, Schiff contests the theory of Henle, Gratiollet and Leven who attributed the movement of rotation to an optic vertigo: the phenomenon takes place just the same in blind animals as in those which can see.

Luciani admits also that movements of rotation take place after section of the peduncle at first towards the healthy side, and afterwards in the opposite direction. The first movements towards the healthy side are engendered by the unilateral exaggeration of the cerebellar influx transmitted to the irritated peduncle, whereas, the others are produced in the opposite direction because the cerebellar influx suddenly ceases to exist in half of the centers, while the other half continues to receive them. The predominance of the action of half the centers is the necessary condition, and the impression of vertigo is the immediate cause. Luciani admits, however, that the phenomenon of rolling can exist without vertigo, but the vertiginous movements seem to have the character of impulsive and irresistible movements. The movements of simple functional predominance of half of the encephalon would have the character of ordinary voluntary or reflex movements. But Luciani attacks the fundamental conception of Schiff for whom the movement of rotation is due to the unilateral interruption of voluntary impulses to the rotatory and fixing muscles of the vertebral axis: The cerebellum is not an organ of the will, that is to say, an organ intercalated in the great path of cerebro-spinal conduction.

Nevertheless, in animals from which he had removed half the cerebellum, Luciani observed movements in only one direction, that is, towards the healthy side, movements which he had observed during the phase of excitation, and which he considered as irritative phenomena. The movements of rotation in the opposite direction would not have been avoided except for the inter-

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vention of the muscular sense, and the proof is that if the muscular sense and the motor impulse be suppressed by destroying a part of the sensory-motor area, the animal is seen at every effort to walk, to roll around the longitudinal axis towards the side upon which the cerebellum is lacking. Upon this point my own experience does not coincide with that of Luciani.

Besides, in the dog, according to Luciani, it is not only the muscles of the vertebral axis which contribute to the production of the rolling, those of the limbs have also their part.

The opinion of Luciani which I have just cited, almost word for word, does not appear to me to be acceptable, and for several reasons. Luciani considers the movements of rolling which he observed in dogs, as movements due to irritation of the peduncle; we must recall that the animals Luciani operated upon were anesthetised and that the movements which he calls irritative were not produced until after the awakening of the animal. I, also, operated upon animals under an anesthetic, but in some cases the anesthesia was not complete when I removed the cerebellum and sectioned the peduncles. I then observed, exactly at that time, some movements of rotation in the opposite direction to those which I observed upon the awakening of the animal. These results may be compared with those obtained by Schiff when he sectioned the peduncles. The first movements which are irritative movements, provoked by section of the peduncle, are altogether comparable to the muscular contraction which is produced when an anterior root is sectioned; those which take place after the awakening are paralytic movements, that is to say, due to the suppression of the cerebellar function. It is these that Luciani has mistaken for irritative phenomena. He did not take into account the fact that the really irritative movements were masked by the narcosis.[1]

It is enough, besides, as I have already remarked in my thesis, to follow the evolution of the disorders of locomotion to thoroughly understand the nature of the phenomena. "When

[1] Luciani says that in animals the rotation around the longitudinal axis is made from the operated side towards the healthy side, but he determined the sense of rotation according to the direction and torsion of the head, and the strabismus; the results which he obtained, therefore, accord perfectly with ours.

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half the cerebellum has been destroyed, whatever be the attitude that the animal wishes to take, and whatever be the movement that he wishes to execute, he is drawn towards the side of the lesion and falls on that side. The first days after the operation he is animated with movements of rotation around the longitudinal axis from the healthy side towards the side operated. (The sense of the rotation is determined by the side upon which the animal falls when he is placed in an upright station, *i. e.*, when he is placed upon his four paws. As he always falls upon the operated side one may say that the rotation takes place from the healthy side towards the side operated.) In repose he rests upon the side of the lesion, and in the abdominal decubitus the head is deviated in the same direction. Later, when he makes his first attempts to walk he is drawn in spite of himself by a movement of translation towards the operated side, and if he falls, he falls on this side. It seems, therefore, that the rotation around the longitudinal axis from the healthy side towards the side operated upon, the decubitus upon the side of the lesion, the fall and the movement of translation in the same direction are but different degrees of the same phenomenon. If the movement of rotation is due to the irritation of the efferent fibers which have been cut, there should be a different direction of the movements consecutive to the suppression of these fibers, and they should be made from the operated side towards the healthy side."

We see how involved is this question of the movements of rotation, not only as concerns the fact itself and its nature, but also as regards the terminology and manner of indicating the direction of the movement. Perhaps these last explanations will permit us to understand this phenomenon, and the contradictions to which it has given rise, more thoroughly. The physiological mechanism of the movements of rotation of the body, as well as those of the conjugate deviation of the eyes, may be cleared up in a certain measure by the knowledge which we have acquired in the last few years concerning the architecture and the anatomical relations of the cerebellum.

The tonic action of the cerebellum is exercised in the case of the vermis by the intermediation of the descending cerebellar bundle, the cerebello-vestibular bundles, and the nucleus of the vestibular nerve, in relation to the spinal cord; for the hemi-

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spheres by the intermediation of the superior cerebellar peduncle and the red nucleus; upon the spinal column (the rubro-spinal bundle) by the intermediation of the superior cerebellar peduncle and the thalamus upon the cerebral cortex (thalamo-cortical fibers).

Each half of the vermis enters into relation with the nuclei of the two vestibular nerves, and with the two sides of the spinal column, but more with the same side by the cerebello-vestibular bundles. It is probable that each half of the vermis does not contract the same relations with the two sides of the spinal column, and consequently, presides over a certain coördination.

Each nucleus of Deiters sends fibers to the oculo-motor nuclei, particularly to the nucleus of the sixth pair of the same side, to the nucleus of the third pair of the opposite side, to the centers of the muscles of the trunk, and the limbs of the same side (posterior longitudinal fasciculus and antero-lateral bundle).

When the cerebello-vestibular bundles are interrupted on one side, a conjugate deviation of the eyes results, such that the eye of the side of the lesion looks downward and inward, and that of the opposite side looks upward and outwards. There is a deviation of the head in the same direction, and a movement of rotation from the healthy side towards the operated side. This totality of phenomena does not differ in any way from that which is obtained from exciting the nucleus of Deiters-Bechterew on the side opposite the lesion. One may admit that in the normal state the forces developed by the two nuclei of Deiters balance one another. If one of them disappears or is diminished in large measure on account of the suppression of the cerebello-vestibular bundles of one side, the other, continuing to act, produces symptoms analogous to those obtained by the excitation of the homolateral nucleus of Deiters-Bechterew. We may reason in the same way concerning the olivo-thalamo-cortical path (superior cerebellar peduncle, thalamus and cerebral cortex), and for the olivo-rubro-spinal path. The results of section of the superior cerebellar peduncle justify this point of view.

Is the Cerebellum a Center of Muscular Energy?

Based upon numerous experiments made upon animals belonging to four types of vertebrates, Rolando attempted to demon-

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strate that the cerebellum was an organ destined for the preparation and secretion of nervous energy, which diversely conducted and modified manifested itself principally in the production of motion and of voluntary movements. Partial alterations of it gave rise to disturbances of voluntary movements, complete destructions to total paralysis. The cerebellum would have even a greater part than the cerebrum in the phenomena of motility. In placing one of the poles of a battery in contact with the cerebellum and the other with a limb, stronger shocks were obtained than if the first pole were placed upon the cerebrum. This influence, however, did not belong properly to it—it borrowed it either from the senses or from the hemispheric excitations. Taking microscopical examination, on the other hand, into consideration, Rolando thought that the large number of lamellæ, alternately gray and white were an electric battery which developed electricity which excited movements.

This theory was criticised by Magendie. He did not deny the facts announced by Rolando, but he did not accept the explanation for he had seen animals deprived of the cerebellum "which nevertheless executed very vigorous movements. I have seen hedgehogs and guinea-pigs deprived not only of their cerebrum, but also of their cerebellum scratch their noses with their fore paws when I placed a bottle of vinegar under their noses."

The theory sustained later by Luciani presents some marked analogies with that of Rolando. Once the irritative phenomena have subsided, the Florentine physiologist distinguishes two orders of phenomena, the phenomena of suppression and the phenomena of compensation.

The suppression is essentially characterized by the imperfect energy that the animal uses in its voluntary acts, by the lack of tonicity of the muscles, and by the abnormal method of their contraction.

Luys also considered the general state of weakness, and the progressive extinction of muscular power as a disturbance characteristic of the locomotor functions in individuals affected with lesions of the cerebellum.

This weakness "may present an infinite number of degrees, from a simple lassitude to a profound prostration with the most complete apathy. The movements are sometimes not harmonic,

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but hardly ever completely abolished. There is asthenia and not paralysis."

After the destruction of the cerebellum by caustics Weir Mitchell observed the phenomena of incoördination, drawing back, and backward falls, but these phenomena were of short duration. That which persisted was a well marked weakness of all movements, whether voluntary or involuntary. The cerebellum would then be an organ of reënforcement, the action of which would be very analogous to that of the spinal and cerebral ganglionic masses.

Dalton insisted also upon the persistence of weakness when the phenomena of the first stage had disappeared.

Dupuy sustained a similar opinion: If a complete ablation of the cerebellum were made, the peduncles sectioned entirely and at the same level, and the whole operation done at one time, there were no locomotor symptoms in the animal experimented upon (dog, rabbit, and guinea pig). The most striking thing was the extreme weakness in the movements of the individual as a whole, and even comparing the weakness which follows the ablation of the cerebral lobes with that consecutive to the ablation of the cerebellum, one is surprised to see that the animal preserves more strength in the first case than in the latter.

The compensatory acts consist according to Luciani, in the isolated form of the voluntary movements, in the anomalies of measure and direction. The totality of these phenomena constitutes cerebellar ataxia.

After the unilateral destruction the weakness is such in the muscles on the side of the operation that the animal might be taken for a hemiplegic; he drags himself along the rump of the side operated upon making his efforts with the limbs of the healthy side. This condition may last for several weeks, according to Luciani. By leaning against a wall the animal may move in a regular manner, but his limbs bend under his own weight. The animal can, however, swim, but the flank of the side operated upon is always plunged deeper in the water than that of the healthy side. The same phenomena are observed for a month or more, during which time the animal makes various attempts to get up and walk. These attempts are the manifestations of the compensatory acts which are capable of correcting and repair-

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ing the effects of the suppression of the cerebellum. The animal broadens its base of support by spreading the front limbs apart, particularly the one on the injured side and the vertebral column is incurved towards this side.

This compensation has its limit. The animal which walks in this way on a smooth surface cannot walk upon a rough or curved surface. When food is offered to it, if it is held a certain distance above the head, the animal attempts to rise up vertically, but falls back on account of the flexion of the posterior limbs. If it is made to pull a weight tied to the tail or to the limbs, its fall is almost certain, particularly if the weight is tied to the limbs of the heathy side.

Luciani concludes from this that the lack of innervation from one half of the cerebellum determines a homonomous neuro-muscular hemiasthenia. There is a diminution of the normal tonus of the muscles, on palpation the muscles appear to be more flaccid, and less tense on the side of the operation than on the healthy side. This is *asthenia.*

During station upon the four paws the animal often flexes the limbs of the side operated upon. The falls seem to be due to the relaxing of the muscles. He raises the paws of the injured side higher from the ground, and replaces them more suddenly. To this second category of phenomena Luciani gives the name of *atonia.*

Finally, there exists tremor, oscillations and wavering which depend upon an imperfect summation of the elementary impulses which govern contraction. This third category of phenomena constitutes *astasia.*

In animals completely deprived of the cerebellum, atonia, asthenia and astasia are still more marked. After a period during which the animal falls continually, first on one side and then on the other, striking the head, he succeeds at first in raising the front paws, but the hind paws bend under him. When the animal tries to eat, his body is animated by strong antero-posterior oscillations. Little by little, he succeeds in walking without falling, and progressing without help. These phenomena are not caused by a lack of coördination says Luciani, because the animals are able to swim. The functional restitution which gradually is produced is due entirely to a substitution by the sensory-motor zone of the cerebral cortex when the extirpation has been total.

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The falls are due to the atonia and the asthenia of the muscles of the vertebral column which cause a greater upward convexity of the vertebral axis, and determine thus an elevation of the center of gravity, and, consequently, a loss of stability of equilibrium. There results also a lesser fixity of the vertebral axis which renders the horizontal oscillations either active or passive, more difficult to resist. Luciani does not see in the drunken gait any perturbation of the sense of equilibrium. The efficacy of the compensatory acts by means of which the animal avoids a fall, shows on the contrary that this sense functions normally.

Luciani concludes, from his experiments, and the anatomical findings furnished by the study of secondary degenerations, that the cerebellum is an homogenous organ. An organ of which each segment has the same function as the whole, and the power of supplying the absence of the others. The loss of the vermis may thus be compensated for by the lateral lobe. The cerebellum exercises, in the normal condition, an influence upon the rest of the nervous system, which is expressed by an action, neuro-muscular, sthenic, tonic and static, that is to say, a complex action by which the cerebellum augments the potential energy which is dispensed by the neuro-muscular apparatus (sthenic action). It increases the duration of their tension during the functional pause (tonic action); it accelerates the rhythm of the elementary impulses during their functional activity and assures a normal fusion and regular continuity of action (static action). The influence of the cerebellum does not alone manifest itself upon those muscles which enter into activity in the different forms of upright station and locomotion, but also in all voluntary movements, particularly those of the superior and inferior limbs, and upon those muscles which fix the vertebral column.

The complex action of the cerebellum is a trophic action, which is exercised directly or indirectly. Directly it is shown by the secondary degenerations; indirectly it affirms itself by the slow degeneration of the muscles and the skin, by the general or local dystrophic troubles, by a greater slowness in the growing and the renewing of the tissues, by a diminution of the resistance of the animal against the harmful actions of external agents, and, finally by a general shortening of life.

The activity of the cerebellum is not an activity *sui generis* but

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rather an activity common, and so to say, fundamental, to the whole nervous system. The physiological value of the cerebellum in the animal life is quite comparable to the value of the peripheral nerve ganglia in the vegetative life. The cerebellum may be considered as a small auxiliary and reënforcing system of the great cerebro-spinal system.

"Finally if it were shown that dysmetria were a constant phenomenon, it would be necessary to add to the sthenic, static, and tonic effects, an action of accommodation, "umpassen de Wirkung," upon which would depend the proper measure, the precision, and the accommodation to the object in view, of the different voluntary, automatic or reflex acts."

The ideas of Luciani have not been universally accepted, and some objections may be made to them. Some in relation to the facts, and others to the interpretation of them.

The observations of Luciani agree, for the most part, with those that other physiologists have made in repeating his experiments. Nevertheless, if I may be allowed to bring in my personal experience, I would remark that reëducation has been less slow with my animals than with Luciani's. In the dog deprived of half the cerebellum, the weakness has never been such that the animal could have been taken for a hemiplegic, or that at any advanced period he sank down under his own weight when he tried to stand up on his hind legs to seize food. Animal fell on one side or backwards, but contrary to what Luciani says, the fall was not due to the flexion of the hind legs. The animals operated upon by Luciani seem, therefore, to have been weaker than those operated upon by other physiologists and by myself. Perhaps in the course of his experiments, Luciani injured centers in the neighborhood of the cerebellum, particularly those of the pons. To the support of this explanation we may mention the secondary degenerations studied by Marchi in the animals upon which Luciani had operated. The degenerations in the spinal cord pass the limits of those which are produced by lesions strictly limited to the cerebellum. They included a bundle situated in the lateral column, and which was none other than the rubro-spinal bundle, or bundle of Monakow, that is to say, a bundle which comes from the red nucleus and passes through the pons.

It is probable that the diffusion of destructive lesions upon

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the organs of the neighborhood is the reason why there was a greater intensity of the symptoms and a paralytic weakness in Luciani's animals.

Nevertheless, Patrizi contends that the movements of protection are less energetic upon the side corresponding to that of the cerebellar hemisphere which has been removed in the dog. To demonstrate this fact he suspended weights from the hind legs after having fixed the trunk and the fore legs; then he excited the skin of the back by means of a faradic current; on the operated side the weight was not lifted so high. The same was the case when the muscle was directly excited, which the author explains by a diminution of tonus.

Longet had already remarked, in opposition to the theory of Rolando, that after the operation on the cerebellum in birds and in young mammals Rolando himself had always seen these animals still perform energetic but incoördinate movements with their four limbs.

The cocks from which Laborde removed the cerebellum, lifted without trouble somewhat heavy weights suspended from their claws. When the paw of a decerebellated animal is pulled, even on the injured side, he retracts it with energy. Asthenia, in the sense which Luciani gives to it, is altogether lacking; the giving way of the legs is not a part of the symptomatology of cerebellar affections.

In patients affected with cerebellar atrophy without a cerebral or spinal lesion at the same time, there is no paralysis.

I have never observed muscular relaxation or hypotony in the sense which is given it by clinicians, in the patients which I have had an opportunity to examine. The sthenic or tonic action of each half of the cerebellum upon the corresponding half of the body nevertheless exists, but it appears to me adapted for a certain purpose, that is, the maintenance of equilibrium.

On the other hand, when Luciani attributed the tremor, the oscillation, and the wavering, to an imperfect summation of elementary impulses, he furnished an explanation which is more conformable to reality.

For certain authors, Adamkiewicz, among others, the cerebellum is more than a regulator. It is an organ, the action of which assures the execution of all of the movements of the body,

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of which the will assures the initiation. It not only elaborates the force which is transformed into movements in the muscles—it contains also a particular center for each group of muscles, and for all a sort of keyboard upon which the will plays in the same way that the musician plays upon the piano. Considerations of various kinds have given to the cerebellum a preponderant rôle in the elaboration of movements. In mammals, even those at the top of the scale (superior apes), the hemiplegia, which follows the ablation of the motor zone of the cerebral cortex, is only transitory, and the animal recovers almost completely the faculty of executing movements with his paralyzed limbs. In the same way the section of the two pyramids in the monkey does not abolish the faculty of executing movements. After the section of the crossing of the pyramids Rothmann did not observe any symptoms of spastic paralysis, only a certain awkwardness and an exaggeration of reflexes, which persisted two or three weeks, was produced. In man, the resection of the motor zone, practiced for the purpose of relieving epilepsy, is often only followed by a light hemiplegia which improves with time. Often, only disturbances of sensibility and incoördination of movements are observed.

These results appear to be in contradiction to the teachings of pathology, and in effect, foci of cortical softening situated in the motor zone entail permanent paralyses, which are accompanied by very severe contractions of the paralyzed member. This contradiction, is perhaps only apparent; the foci of softening are rarely limited to the cortex of the motor zone, and always trench more or less upon the adjacent white substance and the neighboring convolutions and are not in any way comparable to surgical resections. The zone of the cerebral cortex which projects itself upon the cerebellum through the intermediation of the cerebral peduncles, the pontine nuclei, and the middle cerebellar peduncle, is much more extended than the cortical motor zone (ascending frontal convolution). It comprises, among others, the ascending parietal and the second and third temporal convolutions. If we only take into consideration the involvement that these two types of lesions (that is, surgical resections and foci of softening) may have upon the anatomical and physiological relations of the cerebrum and the cerebellum, we cannot put them both in the same category.

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We may ask in fact, what organ is it that presides over the elaboration and execution of movements since the motor zone of the cerebrum may be destroyed without abolishing motility. By reason of the importance of its development and its anatomical relation and of its indisputable rôle in the physiology of movement, one would be disposed to admit that this organ is the cerebellum. It is more probable that it is one of the vicarious organs which may supplement the excitable zone of the cerebral cortex. The disturbances of locomotion are, in fact, permanent when the cerebellum and the excitable zone are simultaneously destroyed, but we cannot range ourselves with Adamkiewicz and make the cerebellum the center of voluntary acts and movements, since, after the destruction of the cerebellum (both in animals and in man), voluntary movement is not abolished, but only modified.

Horsley has returned recently to this question in connection with a very interesting case of resection of the gyrus precentralis (ascending frontal), in an individual affected with Jacksonian epilepsy. The portion of the gyrus which was to be removed was excited by bi-polar faradic currents, and it was posisble to ascertain that the excited lesion corresponded to the center for the upper limb. After the operation the motility of the limb was, in large measure, restored, and from this point of view the result was quite comparable to those which have been obtained in monkeys. Horsley recalls, in this connection, that Rothmann was able to obtain isolated movements of the arm by electrical excitation of the corresponding center, after having interrupted, and consequently put out of consideration, the pyramidal path. He concludes from these various observations that voluntary movements have not their only source in the motor zone of the cerebral cortex. The motor function would also be put into play by the gyrus post-centralis (ascending parietal) which is a center of representation of the limbs, and the fibers of which project themselves through the thalamus by following the internal capsule. One might suppose that after the disappearance of the peduncular path, the restitution of the motor functions was made through the red nucleus and the rubro-spinal bundle of Monakow. The red nucleus does receive, in fact, fibers from the thalamus and from the cerebellum (superior cerebellar peduncle). For

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these reasons we cannot accord the cerebello-rubro-spinal path the principal part in substitution for the cortical motor zone in the execution of voluntary movements, and the hypothesis given out by Horsley, that of the substitution by means of the parieto-thalamo-rubro-spinal path, seems at present the more acceptable. There is occasion, however, to make some reservations as to this interpretation. It is applicable, perhaps in the case of man, whereas, it is debatable in the case of monkeys and other mammals. In fact by making a bi-lateral section of the lateral columns of the spinal cord, that is to say, by interrupting at the same time the pyramidal tract and the bundle of Monakow, Rothmann produced in the monkey only a slight and transitory paresis of the extremities. The question, therefore, is not definitely solved, and besides, the respective rôles of the various centers in the elaboration of movements is far from being definitely elucidated, and it would be imprudent, in this connection, to force analogies between man and animals. Nothing, in any case, authorizes us to look upon the cerebellum as a generating center for voluntary movements.

Hemiplegia, or rather hemiparesis, noticed by Pineles and Mann in certain individuals afflicted with lesions seated in the cerebellum or in the course of the cerebellar paths, may be invoked in support of the theory at present under discussion. Without entering into the details of these observations in which it is mentioned, we may remark that these observations concern principally tumors, or at any rate lesions which do not affect exclusively the cerebellar paths. When these lesions are located in the tegmentum pontis, and cut off, either partially or wholly, the efferent or afferent fibers of the cerebellum, it is rare that they do not trench upon other fibers of the tegmentum, and the pathological physiology therefore becomes extremely complex.

On the other hand, hemiplegia is not constant, and is lacking in observations of lesions strictly confined to the cerebellum. Mann explains it besides as cerebellar ataxia, due to the suppression of the peripheral excitations which come from the muscles. This has, as a consequence, a weakening of the force of innervation.

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The Cerebellum the Center of Coördination and Regulation

Flourens (1824–1842), whose numerous experiments on the cerebellum have remained justly celebrated—these experiments were made principally upon birds but also upon reptiles and mammals—is the first author who localized the faculty of coördinating and regulating movements in the cerebellum.

I recall firstly, the fundamental results of his experiments. In removing the cerebellum of a pigeon by successive layers, he noted that the movements became at first brusque and ungoverned then, gradually, the animal lost the ability to jump, to fly, to walk, and to hold itself upright. Equilibrium was abolished, to remain in an upright position the animal was obliged to support himself with his tail and his wings. The gait was staggering and it had the air of a drunken animal.

It was the same in the case of a turkey cock, whose staggering gait resembled that of a drunken man. After complete destruction, the upright position and walking were impossible. A dog, from which he had removed the cerebellum by deeper and deeper resections, lost immediately the ability to move with order and regularity. The gait became staggering; he drew back when he wished to go forwards. His efforts to feed himself were very great but he could not moderate them. He threw himself forward with impetuosity, and did not fail to fall or roll over himself. He could not seize with his mouth with certainty any object which was presented to him.

From the ensemble of these experiments, Flourens draws the following conclusions:

"1st. In mammals as well as in birds, a slight alteration in the cerebellum produces a slight disharmony in the movements. This disharmony grows with the alteration, and finally, the total loss of the cerebellum engenders the total loss of the regulating faculty of movements.

"2nd. Nevertheless, there is in this regularity and this exact repetition of phenomena, a curious fact, and that is that the movements thus disordered by reason of the lesion of the cerebellum, correspond to all the ordered movements. In a bird which flies it is in the flight that the disorder appears; in a bird which runs, it is in the gait; and in a bird which swims, it is in the act of

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swimming. There is a swimming and a flight resembling drunkenness, just as there is a gait.

"Along with the loss of the cerebellum coinciding constantly with the loss of the locomotor faculties, the intellectual and perceptive faculties do not lose their integrity in any way and on the other hand, as long as the operation does not pass the limits of the cerebellum, there is no sign of convulsions.

"The faculty productive of convulsions or muscular contractions, the faculty of coördination of these contractions, and the intellectual and perceptive faculties, are three orders of faculties essentially distinct, reposing in three kinds of nervous organs, also essentially distinct."

Although all the movements of locomotion may be lost, the movements of conservation are none the less preserved.

One cannot express more positively the coördinating and regulating action of the cerebellum in all movements and in the maintenance of equilibrium.

The coördinating action of the cerebellum has been variously defined by physiologists. Schiff criticizes the theory of Flourens. It is not the irregular succession of movements that is observed after a cerebellar lesion. It is an alteration of the form and the direction of the movements; but the general direction of the movements is preserved. The head is raised when the animal wishes to raise himself upon his paws; it is lowered when he wishes to run away. Schiff recognizes nevertheless that all these movements are disturbed, that there are oscillations and waverings, but the animal reacts in an appropriate manner to these oscillations and to this wavering. To verify the conservation of coördination he placed a squirrel which had been deprived of its cerebellum upon a sounding board; it was easy to observe that the rhythm of the gallop was preserved. The succession was not altered, but the isolated sounds which made up the principal tempo had become unequal in intensity and duration, etc.

The reason for the oscillation of the head is not to be sought, according to Schiff, in an insufficient muscular contraction, which allows the weight or the elasticity of the antagonistic muscles to act, but in a too intense nervous impulse to the antagonistic muscles at the same time. This is why when the animal seeks to take a piece of meat which it sees upon the ground, one can feel

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by palpation of the back of the neck, slight intercurrent contractions of the elevator muscles of the head. These contractions are provoked every time that the head attempts to take or preserve an attitude. If the animal is lying down or if he wishes to sleep all these contractions disappear. The same phenomenon can be observed in the fixator muscles of the dorsal column, and of the lumbar column when the animal wishes to sit up upon his hind paws.

In conclusion, there are aberrations of the motor innervation, which act, not only upon the muscles whose contraction is necessary, but also upon the antagonists and the neighboring muscles.

The action of the cerebellum would thus not be a braking action, such as one arresting certain irradiations of the motor innervation; this action would rather be concentrated entirely in a determinate impulse. In such a hypothesis a bilateral lesion of the cerebellum would entail alterations of movements twice as intense, whereas Schiff insists upon the fact already brought to light by Vulpian that the disturbances of coördination are much less marked after absolutely symmetrical lesions of the cerebellum.

The conclusion of Schiff is that in the cerebellum the apparatus is located which puts into play groups of muscles necessary for the accomplishment of a complicated movement. Not only groups of muscles which direct the wished for movement, but also other groups of muscles which only fix the limb and the joints, and which thus prepare fulcrums for the levers and whose feeble contractions are antagonistic to the movements of the whole.

If paralysis and feebleness of movements are not the consequence of cerebellar lesions, it is, nevertheless, necessary to admit that from the beginning movements are not made with their normal force, the slowness of the movements proves this. Schiff admits that he is entirely unable to explain the mechanism of this seeming reënforcement of movements.

There are, in the views of Schiff, upon the functions of the cerebellum, some very ingenious ideas and some hypotheses which are at first sight extremely seductive. They are not, however, beyond discussion. If coördination is disturbed it is not in as far as concerns the direction of the movement which is preserved. The majority of the authors, both physiologists and clinicians are unanimous upon this point. Once more, the motor disturbances

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of cerebellar patients differ from peripheral ataxia by the preservation of the direction of the movement and by the practically negligible influence of the suppression of sight. On the contrary —both experiments and clinical observation have shown it—the measure of the movement is altered. Luciani admits, with some reserves, that dysmetria exists. The same with Munk. The squirrels of Schiff appear also to execute movements of unequal force, lacking measure. A dog in which the cerebellum has been destroyed raises his paws higher than normal. When the destruction has been in one hemisphere only, only the paws of the same side are raised too high and replaced too forcibly. The same thing happens with a cat (André-Thomas). Lewandowsky mentions unmeasured movements of the fore paw when the animal tries to seize a bone. The clinicians have noted a number of times movements of too sudden a nature in the course of cerebellar atrophies (Déjerine and André-Thomas). Babinski has observed unmeasured movements in patients "in whom the cerebellar apparatus" was in question. I myself with Jumentié have insisted upon the presence of dysmetria when the movements were too rapidly executed, and this is probably the reason why the movements of cerebellar patients are usually slow. They have a feeling of their awkwardness in the too prompt execution of movements.

In the execution of a movement there is nothing but dysmetria. Whether it is a question of movements or attitudes of the head, of a limb, or of the body in cerebellar patients, or in an animal upon whose cerebellum there has been an operation (above all, the monkey), these movements differ from normal movements by oscillations or tremor. The tremor does not exist in the state of complete relaxation of the muscles. It is produced in two conditions: during the execution of the movement, and during the maintenance or beginning of an attitude (see page —).

We recall that this tremor may receive two explanations: (1) The movement is too sudden and unmeasured and the patient corrects it by the antagonistic muscles; this explanation has been previously refuted by me. This is a hypothesis similar to the one proposed by Schiff, with this difference, that according to him intervention of the antagonistic muscles is not voluntary but consecutive to an aberration of the motor innervation. This does not

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appear to us to be any better founded. If when the dog, alluded to by Schiff, seeks to seize a piece of meat which is on the ground, one can feel by palpating the neck slight intercurrent contractions of the elevating muscles of the head; it is not proper to consider these contractions as contractions of the antagonistic muscles, for in this attitude the action of these elevating muscles is directly adapted to the object in view. Really, during the lowering of the head these muscles are relaxed, but incompletely so. The maintenance and variation of their tonicity are essential conditions for the accomplishment of these movements of prehension.

The second hypothesis seems to me to conform more to the facts, as I have already said.

(2) Arrests and recontractions are produced in the muscles. The movement instead of being continuous or tonic is in a way epileptoid or clonic (André-Thomas and Jumentié). There is, according to the expression of Luciani, a defect in the summation of the elementary impulses. The cerebrum supplies the place of the cerebellum, but to a measure in an incomplete manner, and it does not succeed at first in fusing the volitional incitations which preside over the execution of the movement, or the maintenance of the attitude, unless the movement be slow and watched over. Stability, nevertheless, can be attained, but at the expense of a certain time and it is preceded by a period of attempts.

Dysmetria shows in its turn that the elementary impulses are too strong, and consequently that the cerebellum exercises a braking influence upon the totality of the movements. J. Babinski expresses a similar opinion. But, we say again, this influence is manifested in moderating the elementary impulse, and not in causing the antagonistic muscles to intervene.

If the suppression or the diminution of the cerebellar function is followed by dysmetria and discontinuity of movement, one must admit that the cerebellum has a particular tonic influence which has for its object the regulating of the movement and the assuring of its execution with a minimum effort and a perfect adaptation to the object in view. It is thus that we must look upon the tonic action of the cerebellum, and the astasia (*i. e.*, the oscillation and intention tremor) would seem only to be a consequence of it. In reality this is practically the same idea expressed by Luciani when he says that the tonic action of the cerebellum

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consists in increasing the duration and the tension of the muscles during functional pause. The action of the cerebellum is, therefore, at the same time inhibitory or braking, and excitor-motor or tonic. In any case, the disturbances of tone of cerebellar origin should not be confounded with the hypotonus of tabetics, which is manifested by an articular relaxation.

The cerebellum is a regulator, but it is not only a regulator of muscular contractions; according to Schiff the cerebellum is the seat of apparatus which puts into play the muscular groups necessary for the accomplishment of complicated movements, and as such it plays a preponderant rôle in equilibrium. This is, in fact, the theory of asynergy propounded by J. Babinski, which will be taken up again a little further on in relation to equilibration. Munk and Probst have expressed a similar opinion. For them the cerebellum is a regulating apparatus for muscular action, entering into play in the maintenance of the station of the body, in locomotion and in voluntary automatic and reflex movements.

According to the observations of Horsley, the activity of the nerve centers is translated by a combination of clonus and tonus, and the motor manifestations differ according to the proportions of one or the other. Clonism is a property of excitation from the cerebral cortex and tonism of the subjacent centers. The conclusions of Horsley and Bouché are very easily demonstrable on this point. They injected essence of absinth into the jugular vein of a cat three weeks after the ablation of the left cerebral hemisphere. On the left side a tonico-clonic access of contractions was produced with the limbs in flexion, on the right side a tonic access, principally in extension. During the course of an access, the authors made an instantaneous section of the mesencephalon: immediately the clonic movements were changed into tonic ones in the whole body, the head was drawn backwards and the limbs of the left side were in extension. Excitations of the inferior centers, among which is counted the cerebellum, gave rise to exclusively tonic attacks. Some clinical facts also sustain this observation. I will cite among others the following observation of Jackson. It concerns a child afflicted with a tumor of the median lobe of the cerebellum as large as a billiard ball. The gait was staggering, the legs executed excessive movements and were stiff and in extension along the prolongation of the body.

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The feet were in hyperextension, slightly inclined inward. Occasionally tetanoid convulsive attitudes were observed. This is how they were produced according to Mackenzie who observed them: The forearms were flexed upon the arms, the arms were held close to the sides, the head drawn backwards, with an incurvation of the back, the legs stretched out, also incurved. The patient passed urine sometimes during these crises. During the crisis the attitude was the caricature of a man or a child running very rapidly. Jackson concludes from this that in convulsions of cerebellar origin the spasm is tonic, whereas in cerebral convulsions it is principally clonic. The convulsions affected more the bilateral muscles of the legs and trunk, whereas in cerebral affections the muscles of one side are more affected, and those of the arm more than those of the leg. These crises resemble tetanus more than epilepsy. In conclusion, according to Jackson, the cerebellum coördinates more particularly those movements which serve the purpose of locomotion and other quasi-automatic acts, whereas the cerebrum coördinates more particularly those movements which serve for voluntary acts.

This opposition established by Jackson between the clonic character of the cerebral convulsions and the tonic character of those of cerebellar origin, is to be compared with the special form that movement takes in individuals affected with cerebellar atrophy. It becomes discontinuous and clonic, apparently on account of the disappearance of the tonic cerebellar influx.

The Cerebellum and Reflex Movements

In animals which are deprived of half of the cerebellum the tendon reflexes without being spasmodic are exaggerated on the side of the destruction (Russell and André-Thomas). In the same way an exaggeration of the reflexes is noted in man in most of the cases of primary atrophy of the cerebellum. It seems, therefore, that under the influence of the functional suppression of the cerebellum there would be in the reflex movements, as in the voluntary and automatic movements, a defect of measure. One may allow to the cerebellum a general braking influence, exercised over all movements. Patrizi has controlled this fact by the graphic method, the reflex is prompter, and the excursion of the member is greater on the side of the hemi-destruction.

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The Cerebellum, Equilibration and Synergy

It is incontestable that dysmetria and discontinuity of movement contribute to disturb equilibration. The disturbances of equilibration, however, appear to consist of more complicated disorders.

The loss of equilibrium was noted by Flourens in the animals from which he removed the cerebellum in successive layers. According to Bouillaud, an animal deprived of its cerebellum is not paralyzed. What it lacks is coördination of the movements of walking and of standing. On the other hand, the simple movements of the head, of the trunk and of the limbs can be performed. Bouillaud admits that there exists in the cerebellum a force which presides over the association of the movements of which the divers acts of locomotion are composed.

The experiments of Ferrier upon the functions of the cerebellum have been previously related at length. Some reservations were made as to the value of the results from electrical excitations, because those authors who have repeated them did not obtain concordant results; the excitability of the cerebellum is still a question to be studied. Ferrier looks upon the cerebellum as a complex arrangement of centers individually differentiated, which, acting together, regulate the divers muscular adaptations necessary for the maintenance of equilibrium. Comparing the effects of excitations with the symptoms observed in the course of disease, or in experimental lesions of the cerebellum with those which have been described by Purkinje and Hitzig, as when one causes a galvanic current of moderate strength to flow through the head, with the vertiginous sensation produced by rotation around the longitudinal axis, and the secondary compensatory reactions, Ferrier deduces that the right side of the cerebellum coördinates the muscular mechanism which prevents a displacement of equilibrium to the opposite side; in the same way the movement backward of the head, the extension of the trunk, and the limb, and the elevation of the eyes, determined by an irritation of the anterior part of the median lobe, are the compensatory efforts to counterbalance rotation forward.

"The cerebellum would apear to be, therefore, a complex arrangement of centers individually differentiated, which, acting together, regulate the various muscular adaptations necessary for

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the maintenance of equilibrium; every tendency to a displacement of equilibrium around a vertical, horizontal or intermediary axis, acting as an excitant for the particular center which calls into play the compensatory or antagonistic action."

The cerebellum is developed proportionally to the variety and complexity of the muscular activities. Lesions of the cerebellum do not cause paralysis of voluntary movements. If fatigue supervenes rapidly in animals upon whom a cerebellar lesion has been made, it is as a result of the efforts which they are obliged to make to replace a mechanism independent of consciousness, and not because the cerebellum is a source of energy, that this takes place.

In his later researches, made in collaboration with Turner, Ferrier is less categorical, and he recognizes that the problem of the function of the cerebellum is not nearly solved.

I have insisted in my thesis upon the importance of the disturbances of equilibrium in animals deprived partially or wholly of the cerebellum. When an animal has been deprived of half its cerebellum, no matter what attitude it wishes to take, or what movement it wishes to execute, it is drawn towards the side of the lesion, and falls towards that side. The first days after the operation it executes movements of rolling about a longitudinal axis, from the uninjured towards the injured side. In repose it lies upon the injured side and in the prone position the head is deviated toward that side. Later, when it makes its first attempts to walk, it is drawn in spite of itself by a movement of lateral translation to the operated side and falls in that direction. The rotation about the longitudinal axis, the decubitus upon the side of the lesion, the fall, and the movement of translation, are but the same phenomena in different degrees. I have explained a few pages back the nature of these phenomena and I have rejected the theory proposed by Luciani, who makes them irritative phenomena. For me they show, on the contrary, the loss of the totality of those reactions which prevent the displacement of the center of gravity towards the side of the lesion, and consequently a disturbance of equilibrium.

While standing upon the four paws, one can admit that in a normal animal equilibrium is preserved because the tonicity of the muscles of the head and the vertebral column are equal on

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both sides. Suppose that the actions of the muscles of one side are lacking or are weaker? That of the muscles of the opposite side, continuing to act alone, will determine a movement of torsion about the longitudinal axis, that is to say, a movement of rotation.

When, during walking, a fore paw is lifted from the ground, equilibrium is compromised, and the body tends to sink down on the same side if a modification of tonus in certain muscular groups is not produced. A modification which is only a force of reaction consisting of, in this type of animal, a movement of torsion of the neck and the anterior portion of the body, about the longitudinal axis, associated with an inclination of the head in the opposite direction, or, if one prefers, in an augmentation of the tonicity of the corresponding muscles. In an animal deprived of the cerebellum this reaction is lacking, this is why the animal falls on the same side as the destroyed hemisphere. The fall is all the more brusque as the contra-lateral force of reaction continues to act. This is why according to the judicial observations of Schiff and Vulpian equilibrium seems to be more profoundly disturbed after the destruction of half of the cerebellum than after the destruction of the whole of it.

What is true for the lifting of the fore paw is equally so for the lifting of the hind paw.

Whether the destruction of the cerebellum has been unilateral or total, these phenomena amend progressively and the animal succeeds successively in standing up, in walking, and, eventually, in running. The cerebellum is supplied by other centers and more by the cerebrum than by all the others. Equilibrium, instead of being spontaneous and automatic, becomes in a manner a thing intentional or willed. The body has no longer the suppleness it had before the operation and is as if ankylosed. The head is stiff and fixed. The paws are not lifted with the same regularity and at the proper time. The limbs are lifted suddenly and replaced in the same manner. These disorders reappear or increase when the animal progresses on an inclined plane. During the ascent of a stairway the head and the trunk are placed in exaggerated hyperextension, and at the moment of projecting its paws forward the animal falls backward. It is no longer capable of associating the movements of the head and the body with those of

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the limbs; or either it does it too suddenly and equilibrium is broken. Recently Hulshoff Poe insisted upon the differences between the jump of a normal dog and that of a dog deprived of its cerebellum. In the first, at a certain moment, the two hind paws are drawn simultaneously to the body; the dog deprived of the cerebellum, after the period of asthenia has passed, can also jump, but his two hind paws take dissimilar attitudes, instead of being placed simultaneously in a symmetrical position as in the normal dog.

An individual affected with cerebellar atrophy conducts himself in the same manner. When he descends a stairway, the body does not follow the movement of the legs, and he often risks falling backward. In the same way as in the dog the movements of the posterior and anterior paws do not associate themselves together regularly, so in man during walking, the movements of the arms do not associate themselves with those of the legs and the body. When a cerebellar patient places his foot upon a chair, or simply lifts it from the ground, he does not any longer execute the necessary compensating movements for the maintenance of equilibrium broken by the displacement of the center of gravity. Besides, is he not conscious of this defect of equilibrium and stability, which manifests itself at the least change of attitude, or the least displacement of the center of gravity?

Schiff is right when he says that the cerebellum is the center of an apparatus which puts into play the necessary group of muscles for the accomplishment of a complicated movement. Ferrier is also right when he maintains that the cerebellum regulates the various muscular adaptations necessary for the maintenance of equilibrium.

Luciani has vigorously combated this theory; the preservation of the power of swimming in animals deprived of their cerebellum and the efficiency of the compensatory acts by means of which they seek to avoid a fall show, on the contrary, according to him, that the sense of equilibrium functions normally.

These two arguments are weak. Is it not evident that the conditions of equilibration are very different in the water than upon the ground, and that in the first situation they are much more easily realized? As to the efficiency of these compensatory acts, it merely proves that the faculty of equilibration can be re-

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gained in part, thanks to the intervention of other centers than the cerebellum, and particularly to that of the cerebrum.

The theory of asynergy, set forth by M. Babinski, after an examination of patients with diseases of the cerebellum, or of the cerebellar paths, but in whom the cerebellum does not always appear to be the only organ in question, hardly differs from the theory of Schiff, of Ferrier, and of the one which I have myself maintained. Since asynergy is nothing but a disturbance of muscular association, the impossibility, or the difficulty of associating simple movements which combine for the execution of a complicated movement, it does not differ because asynergy, such as is understood by M. Babinski, is a more general fact, and includes all muscular association, and because it does not consider anything but the association of movements. In the theory which I have formerly maintained, I had particularly in view the muscular reactions adapted to the maintenance of equilibrium. The animals deprived of the cerebellum, the patients afflicted with cerebellar atrophy, have in effect lost the rhythm and harmony of the movements as a whole, whether it is a question of walking, running, ascending a stairway, or jumping. It is to be noted likewise that in the majority of the tests that M. Babinski has invented to show asynergy, it is a question of association of movements during which the equilibrium of the body is in consideration, but in some of them, nevertheless, asynergy exists in the execution of movements or acts which do not compromise equilibrium.

One can only ask if sometimes the patient does not voluntarily intervene in the decomposition of the movement, because he is conscious of the awkwardness produced by dysmetria. In any case, the tests invented by M. Babinski should be repeated with other patients, and more particularly with patients afflicted by destructive lesions strictly localized in the cerebellum. It is only in such patients that one can appreciate their physiological value.

With Luciani, Munk recognizes that the cerebellum plays a rôle of motor reënforcement which it exercises upon the spinal muscle centers. This function is in no way peculiar to the cerebellum, it shares it with the cerebrum. (Luciani also thinks that the very complex physiological activity of the cerebellum is not

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a specific activity, *sui generis,* but rather a common activity, or so to say, a fundamental activity, of the whole nervous system.) The true specific function of the cerebellum would be, according to Munk, the static function, which has already been admitted by Luciani.

In an animal in which the cerebellum has been destroyed, it is above all the fine and delicate equilibrium which disappears, it can no longer take a dangerous position, or at least it takes it with great difficulty, but when taken it can preserve it, thanks to a coarser faculty of equilibration assured by other nerve centers. Munk inquires, nevertheless, if in destroying the cerebellum he really removes a center of delicate equilibrium, or if he does not only disturb motility and the sensibility necessary for the realization of this delicate equilibrium; but he adopts the first hypothesis because the animals are still able to execute normally a large number of movements: licking, to wagging the tail; the monkey can eat from its hand, lick its paw, catch flies, etc.

The differences which exist between the normal and the cerebellar gaits do not depend, according to Munk, upon a disturbance affecting the execution of movements of the extremities adapted to walking. From the second week after the operation the dog, whether he is lying upon his side or lifted by the skin of his back, executes in the air the normal movements of walking with his extremities. A monkey climbs with normal movements. Consequently, according to Munk, if these animals are not able to walk normally, it is because they have been deprived of the power of maintaining their equilibrium by the aid of the muscles of the vertebral column and the extremities. This deprivation concerns the maintenance of equilibrium which is allied in the normal movement of walking to these normal movements of the extremities. After the operation the animal tries to walk as before, but as he fails to do so, he adopts a new method, which is the jumping gait. This is a functional compensation. The thing that proves this is that the monkey walks normally when he is leaning against a wall and does not take to the jumping gait until he leaves the wall.

The isolated movements of the limbs, however, are not so intact as he at first affirmed; since Munk admits the existence of dysmetria, for him this is the necessary consequence of the dimi-

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nution of the excitability of the muscular and spinal centers of the coördinated movements. When it is necessary to change the elevation of an extremity to a depression, flexion to an extension, abduction to adduction, the diminution of excitability retards the second movement or even inhibits it, and the first movement exceeds the normal; it is thus that it is necessary to explain the diminution of the strength of the operated side, and the awkwardness of prehension.

Munk does not accept the disturbances of cutaneous sensibility observed by Russell and Lewandowsky. On the other hand, he maintains that deep sensation is affected: "Sensory excitations which originate in the muscles, in the articulations and in the bones, a part of which normally go to the cerebrum in passing through the cerebellum, are lost when the cerebellum is destroyed." He concludes also that there exists a cerebellar tonus limited to the vertebral column and to the extremities, and which takes its source exclusively in deep sensation, but that this function is common both to the cerebellum and to other nerve centers. Its specific function, repeats Munk, is the delicate maintenance of equilibrium, or its regulation; in the seated or lying position, in walking and in standing up.

The theory of Munk approaches closely to the theories propounded before upon the rôle of the cerebellum in equilibration. It differs from them by its complexity. The disturbances of deep sensibility are open to dispute. This explanation of dysmetria conforms very little to the actual reality. Nevertheless, the works of Munk have served to throw light upon the rôle which the cerebellum plays in the maintenance, and particularly in the reëstablishment of equilibrium. All the same he has justly brought out the fact that the function of the cerebellum as a center of reënforcement is by no means specific.

As I have already formerly explained, in an animal in which the cerebellum has been destroyed, every complicated movement and every attitude necessitates a sum of efforts much more considerable than in a normal animal. Before he is able to reacquire or to find the mechanism which permits him to reëstablish his equilibrium, the dog which has been operated upon must, so to speak, test his muscles, and from this arises the cause of fatigue and of atony in the sense that Luciani has given it. Each cere-

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bellar hemisphere is certainly a source of energy for the corresponding side of the body. But this energy has a special use: it is principally adapted to the reëstablishment of equilibrium or of stability in all of the attitudes and all of the movements of the body. When the cerebellar function has just disappeared equilibrium is not on that account definitely lost, because it can be in large part reacquired, but it is then an equilibrium or a stability less perfectly and less rapidly obtained. The oscillations, at times very strong at the beginning of the movement, can afterwards become much slighter and even disappear.

This is the distinction between fine equilibrium and coarse equilibrium proposed by Munk. The cerebellum looked upon thus is an organ of perfecting, and as such it spares this task from the cerebral activity and permits it to spend itself otherwise.

M. Babinski establishes a distinction between kinetic, volitional equilibrium which would be disturbed in cerebellar patients, and static equilibrium which would be preserved or even exalted. To the support of this opinion he invokes catalepsy, which he has observed in some patients affected with cerebello-pontine lesions, and which has been noted by Rossi in a case of parenchymatous atrophy of the cerebellum. Experimentation and clinical observation show in effect that static equilibrium is less disturbed than kinetic equilibrium, and that immobility is easier to obtain in those movements which do not modify the conditions of equilibrium of the body. Animals deprived of the cerebellum have, besides, a tendency to inertia. In young animals when the sight is suppressed, there is a complete inertia of volition; the limbs remain in any position that is given them, on the condition that it does not provoke a painful reaction and that they are not in opposition to the laws of gravity (Borgherini and Gallerani).

I observed a dog deprived of his cerebellum who later became blind, which found itself in the same condition; it kept any position that was given it; it seemed indifferent to everything that happened around it, and scarcely reacted even to painful excitations. It did not bark, and was in a very marked somniform state (Fig. 51).

The same tendency to keep the attitudes of the limbs which were given to them has been noted in some patients affected with abscess or tumor of the cerebellum, but these facts, strictly speak-

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ing, do not enter into the type of catalepsy described by M. Babinski and approach more the abnormal attitudes, or the persistence of given attitudes which have been noted by various authors in animals deprived of the cerebellum (Lewandowsky and Munk).

Finally, I admit that the functions of the cerebellum are not limited to the equilibration of the body, and that the inhibitory and tonic action of the cerebellum makes itself felt in all movements and all attitudes. But as regards the disturbances of equilibrium in cerebellar patients and in animals deprived of the cerebellum, they appear to me to depend not only upon the loss of the tonic and regulatory action of each muscle which enters into contraction, but also to a lack of tonic synergy in the muscular groups which act together in the maintenance of equilibrium for a given movement.

I recall, therefore, the conclusions which I formulated in my thesis in 1897. "The cerebellum should be considered as an organ developing itself in the course of the sensory paths, with which it enters into relations in the adult, by more than one bundle of fibers. It registers peripheral and central excitations and impressions and reacts upon one and the other. It is not the seat of any peculiar sense but the seat of a particular reaction put into play by various excitations. This reaction applies itself to the maintenance of equilibrium in the various forms of attitudes or actions reflex, automatic or voluntary. It is a reflex center of equilibration." I had, then, in view particularly the equilibration of the body in general; during walking and during the upright position. But on account of the tremor of the limbs and of the too sudden movements noted in a number of observations I likewise supposed that the cerebellum intervened in the maintenance of equilibrium of the different parts of the body and of the limbs in particular. Is it not logical, indeed, to consider as a perturbation of equilibrium the difficulty or impossibility in which animals or individuals deprived of their cerebellum find themselves to obtain perfect and immediate stability in the execution of various movements, or in the taking of an attitude?

It is in the vermis and perhaps also in the lateral lobe that the tonic function of the cerebellum which is adapted to the maintenance of equilibrium and the attitudes and displacements of the

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body is seated. It is exercised under the influence of peripheral excitations which come to the vermis traversing the restiform bodies (fibers of medullary and spinal origin), or central excitations which leave the cerebral cortex and reach the lateral lobe after having followed the crural path, the superior layer of the pons, and the middle cerebellar peduncle. Among these central excitations those which come from the cortex of the temporal lobe, passing by the bundle of Türck, deserve special mention, since their center of origin is considered by Mills as being a center of labyrinthine representation. This is why we cannot exclude the lateral lobe from the centers which preside over the functions of equilibration. According as to whether it is the vermis or the lateral lobe which enters into activity, the centrifugal excitations follow the nucleus of the roof, and the cerebello-vestibular bundles in the first case, and the dentate nucleus and the superior cerebellar peduncle, in the second. In the first case, they end in the motor spinal centers through the intermediation of the vestibular nuclei, or the descending cerebellar bundles. In the second case, they do not end there until they have traversed either the red nucleus (cerebello- rubro-spinal path) or the thalamus and the cerebral cortex (cerebello-thalamo-cortico-spinal path). It is probable that the regulatory function of movements has its principal seat in the lateral lobe and that it is exercised under the control and command of the cerebral cortex by the intermediation of the cerebro-rubro-spinal path, and the cerebro-thalamo-cortico-spinal path (see Figs. 28 and 29, pages 39 and 41).

These considerations have for a basis the notions of normal and comparative anatomy, and also clinical and experimental facts. Sections of the superior cerebellar peduncle are followed by a homolateral tremor of the limbs analogous to that of multiple sclerosis, likewise in man, lesions of the tegmentum, which destroy the red nucleus, or the superior cerebellar peduncle, give rise to the same phenomena (syndrome of Benedict).

But in their intimate mechanism, these coördinations are not identical in man and in the various types of the animal series, because the anatomical centers which enter into play have neither the same importance nor the same structure. The red nucleus in man and in the anthropoids, to give only one example, is not the same as it is in the inferior mammals (Monakow). The rubro-spinal bundle is rudimentary in the higher apes and in man.

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Substitution for the Cerebellum by the Cerebrum

The observation of animals which have been deprived of their cerebellum shows that this organ is partially supplied by other centers. At first, particularly as concerns equilibrium, it seems that the two halves, or even the various parts of the cerebellum, can substitute for one another to a certain degree. The characters of movement, which become more intentional, lets one suppose that a large part is attributable to the cerebrum, and more particularly to the motor zone of the cerebral cortex. This influence seems to be again demonstrated by the fact that in a dog deprived of half of the cerebellum, and already very much improved, the disturbances of equilibrium reappear when its attention is distracted.

In man the progressive atrophies do not ever give rise to disorders so intense as in an animal immediately after an operation. The restoration of the function is contemporaneous with its progressive weakening and partially masks it. This restoration is also due to the substitution for the cerebellum by the cerebrum.

Luciani has shown that a dog deprived of its cerebellum from which the two sigmoid gyri had also been removed, became incapable of learning to walk or to stand upright again, even several months after the second operation. Similar observations have been made by O. Polimanti, who observed that the disturbances consecutive to the destruction of one half of the cerebellum were augmented after the ablation of the frontal lobe of the opposite side. This author believes that the frontal lobes contribute in a measure to the maintenance of equilibrium, particularly to the maintenance of the coarse equilibrium of Munk.

The following anatomo-clinical observation can be compared with this fact. In a woman aged fifty-four years affected with olivo-ponto-cerebellar atrophy (diagnosis verified by autopsy), the disturbances of equilibrium, of station, and of gait, nystagmus and scanning speech, were so marked that the diagnosis of multiple sclerosis had been made. Dr. Touche gave me the specimens for a histological examination by serial section (Figs. 74 to 76). This examination demonstrated that besides the cerebellar atrophy there was a bilateral lesion of the cerebral peduncles. In the sections colored by the method of Weigert-Pal the bundle of Türck and the internal three fifths were completely

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decolored. The large fibers were less numerous in this case and the fine fibers were abundant. The neuroglia was proportionately proliferated. Lower down in the superior half of the pons some small bundles of the crural path were also manifestly degenerated. The pyramids were absolutely intact. Histologically the lesion was quite comparable to that of multiple sclerosis. However, in no part were patches of sclerosis found. Compared to other reported observations of cerebellar atrophy, this observation is very important. It demonstrates that the disturbances

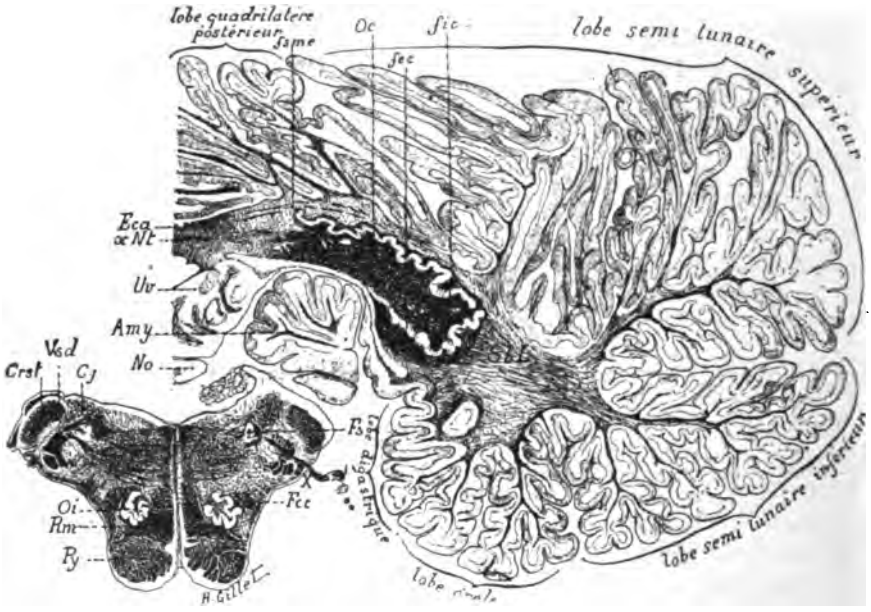

FIG. 74. Transverse section of the medulla and the cerebellum in a case of olivo-ponto-cerebellar atrophy, associated with a double peduncular lesion (Weigart-Pal stain). Atrophy of the cortex and the white substance of the cerebellum (*SbL*). Atrophy of the medullary olives (*Oi*), and the restiform body (*Crst*). Relative integrity of the cerebellar olive (*OC*). (André-Thomas, *Revue Neurologique*, 1905.)

due to atrophy of the cerebellum are accentuated by the fact of the interruption of the cortico-motor path, and consequently that the cerebral cortex substitutes in a large measure the cerebellum.

What happens to the electrical excitability of the cerebral cortex after the destruction of the cerebellum?

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Russell noted that ten or fifteen minutes after unilateral destruction of the cerebellum the cerebral hemisphere of the opposite side is more excitable than the homolateral hemisphere. The difference of excitability amounts to 200 to 300 on the scale of Kronecker. The same results have been registered three months after the operation. If, in an animal, from which half the cerebellum has been removed, intravenous injections of absinth are

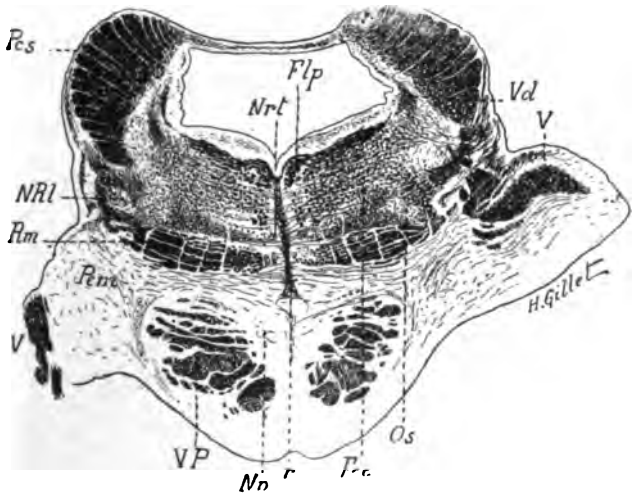

FIG. 75. Same case as the preceding figure. Transverse section of the pons. Atrophy of anterior surface and total degeneration of the median cerebellar peduncle (*Pcm*). Integrity of the superior cerebellar peduncle (*Pcs*), and of the crural path (*VP*).

made, the convulsions are much more intense on the side corresponding to the hemisphere removed (Figs. 77 and 78). Luciani has made analogous observations. Electrical excitations of the cerebral cortex on the side opposite the destruction of the cerebellum produces reactions which are stronger for the majority of the points excited. Bianchi, on the contrary, has found that the motor reactions determined by excitation of the cortex are not modified by partial total destruction of the cerebellum. If in reality the excitability is augmented, one may conclude that each cerebellar hemisphere exercises a crossed, braking action on the motor cortical zone. This exaggeration of excitability ac-

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cords very well with dysmetria and the epileptoid character of movement noted in man and in animals, in the case of the enfeeblement or disappearance of the cerebellar function.

The cerebrum supplants the cerebellum not only as a motor center but also as a sensory center. The elaboration of peripheral impressions appears to play a certain rôle.

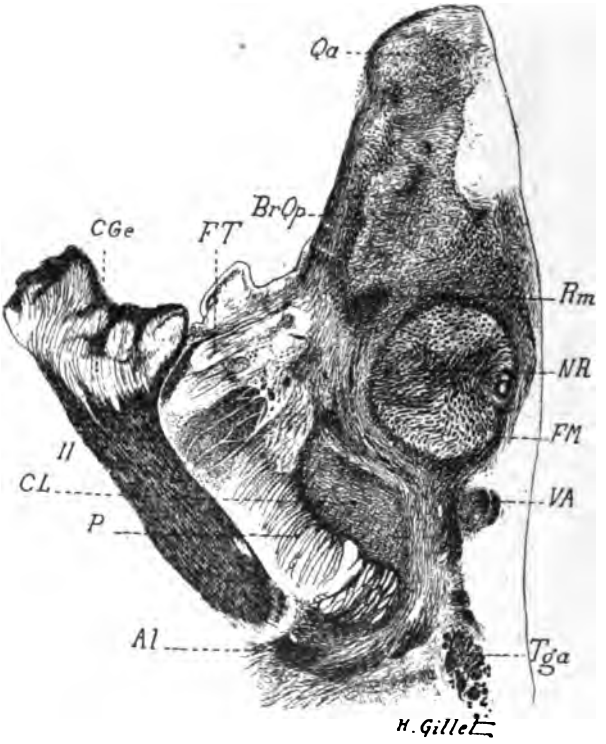

FIG. 76. Same case as the preceding figures. Degeneration of the internal three fifths of the crus cerebri and of the external fifth, or bundle of Türck (*FT*). Integrity of the red nucleus.

When a dog has partially reacquired the function of equilibrium after the total destruction of the cerebellum, he presents the graver cerebellar and ataxic disturbances in the posterior extremities if the posterior lumbar roots are sectioned (Bickel and Jacob).

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The influence of the peripheral excitations which come from the labyrinth is still more remarkable. In a dog upon which I made an intracranial section of both eighth nerves, the cerebellum was totally destroyed about a month after the first operation:

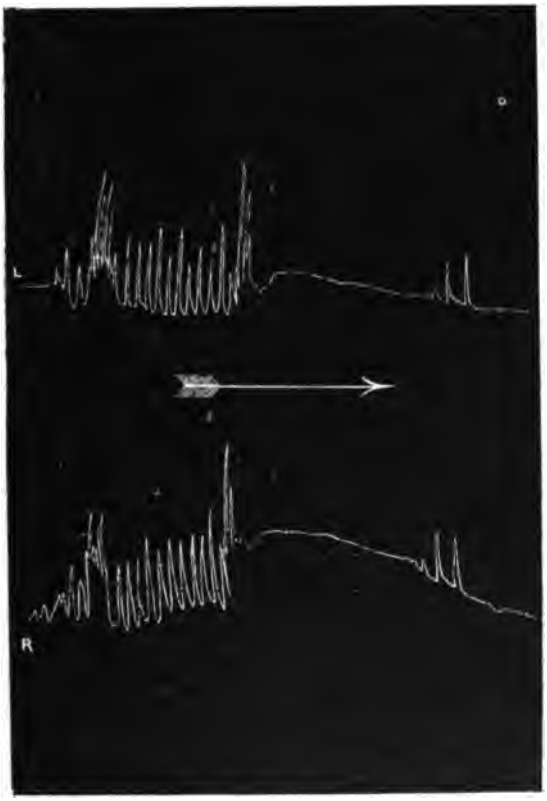

FIG. 77. This and the following figure are borrowed from Risien Russell. Experimental researches into the functions of the cerebellum. Philosophical Transactions of the Royal Society of London. Vol. 185, pp. 819–861. Convulsions produced by absinthe in a normal dog. Record of the extensor muscles of the anterior extremities.

He was unable to learn to walk again, or even to stand upright. The two front legs were folded under the body; he made some efforts to raise himself and walk, but he fell immediately on his

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side and nearly always on the right side.[1] During the taking of food the head oscillated violently and, although he was well fed, emaciation was very marked. Sixty days after the operation the

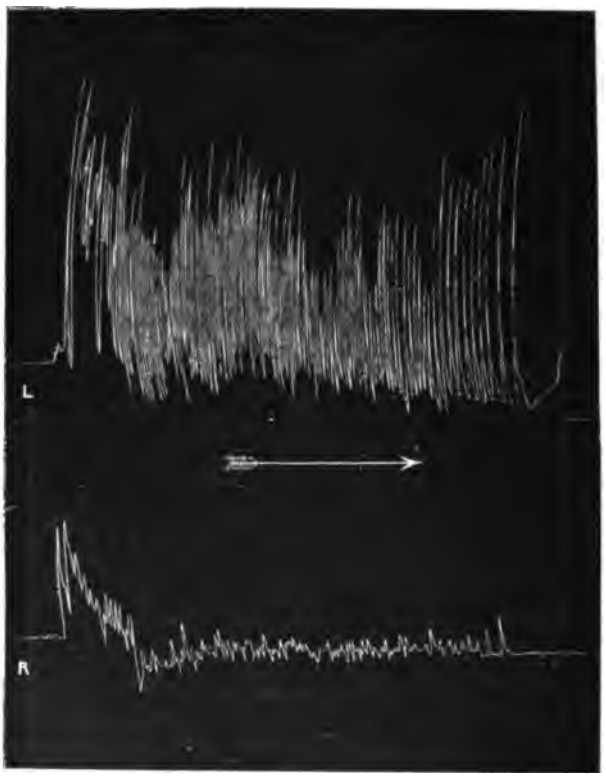

FIG. 78. Convulsions produced by absinthe in a dog deprived of the left lateral lobe of the cerebellum. Record of the extensor muscles of the anterior extremities. To the left (*L*) the shocks are greater than to the right (*R*).

animal had made no progress, either towards walking or standing upright.

[1] The examination of the neuraxis in a series of sections revealed besides the destruction of the cerebellum, and the bilateral section of the eighth pair, a lesion of the nuclei of the posterior column on the right; the triangular auditory nucleus and the nucleus of Bechterew, on the same side, were also slightly affected.

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The simultaneous destruction of a cerebellar hemisphere and the eighth nerve of the same side provokes disorders of an intensity and a duration far greater than the simple section of a cerebellar hemisphere (Figs. 43 to 45). The movements of rotation persist much longer and it is the same for the other cerebellar symptoms. In an animal deprived of the cerebellar hemisphere and of the vestibular nerve of the right side in a first operation the left sigmoid gyrus was removed over seventy days later. The movements of rotation reappeared with extreme intensity and persisted for about twenty days. They were made in the same direction as after the first operation. (This is a new argument against the irritative nature of the movements of rotation.) The disorders of motility reappeared with greater intensity and three months after the second operation the animal was incapable

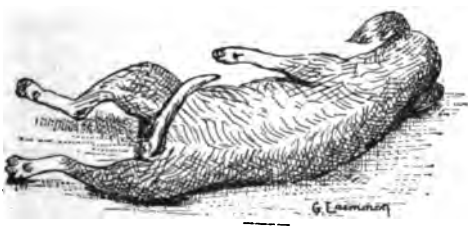

FIG. 79. The same dog as the one represented in Figs. 43, 44 and 45, after destruction of the left sigmoid gyrus. Repeated falls on the right side.

of standing up or of walking. At each attempt it fell almost immediately to the right, *i. e.*, to the side of the cerebellar lesion (Fig. 79).

Another dog which was operated upon on three occasions for section of the right auditory nerve, ablation of the sigmoid gyrus on the left side, and destruction of the right cerebellar hemisphere, was unable to reëducate itself after the last operation. After the second operation there was a recrudescence of the symptoms.

Experiments of the same type have been made upon pigeons by Lange. This author destroyed: First, the labyrinth in animals which had previously suffered a destruction of the cerebellum: Second, the cerebellum in animals which had previously suffered the destruction of the labyrinth.

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In the first case the movements of rotation of the head appeared sooner. These movements were very disordered: there were tumbles backward and to the right, inability to stand upon the legs, emaciation was rapid and the animals showed no tendency towards an amelioration of their condition. In the second case if the operation is performed at a time when the animal only presents those symptoms discoverable by delicate means of examination, the disturbances which follow the extirpation of the cerebellum are the same as those which follow a simple cerebellar extirpation, but the tendency to draw back is more marked and the symptoms show a greater intensity.

The substitution of the cerebellum by the other nerve centers, and more particularly by the cerebrum, raises a delicate question of pathological physiology. Without counting the cases of softening limited to the cerebellar cortex which have shown no clinical expression, how can we explain the complete agenesis of a cerebellar hemisphere which has shown itself only as post-mortem finding and has not affected the functional locomotion or motility. Several hypotheses can be proposed to explain a fact apparently so paradoxical; either there may be a substitution for the absent cerebellar hemisphere by the cerebellar hemisphere which is present, or it may be substituted by the cerebral hemisphere of the opposite side or perhaps both these methods of substitution are associated. In the observations of total agenesis of the cerebellum it is rare that disturbances of motility and locomotion are not mentioned. More often it is true these disturbances have not been analyzed and it is difficult in merely reading of them to conceive an exact idea of their nature. It is nevertheless surprising, to only cite one example, that the extreme smallness of the cerebellum in the patient of Oddo had not occasioned any motor disorders. It is clearly specified in this observation that the movements were forceful and dextrous, but febrile and impulsive. This time also we must have recourse to the preceding hypotheses in order to explain the absence of symptoms and must invoke the idea of cerebral substitution. Perhaps, if in those individuals in whom the cerebellum is either only partially developed or totally lacking, the symptomatology is more abortive than in those individuals who at a more advanced age are affected by a cerebellar lesion, it is because in the last case one must take into account

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not only the functional suppression of the cerebellum but also the secondary modifications introduced into the functioning of other organs by the derangement of a mechanism with which they have always been associated. *A priori* it seems logical to admit that the substitution is more easily made, and more complete the earlier it takes place, and before it has been affected by previous habits. Finally, the variations of one case from another may be explained by individual differences which are the more accentuated as the subject is higher in the animal scale. The same is the case in all other cerebral involvements.

Analogies between the Phenomena Following Section of the Eighth Pair of Nerves and Those Following the Destruction of the Cerebellum. Anatomical and Physiological Relations between the Labyrinth and the Cerebellum

There exist between these two orders of phenomena some very marked analogies. For Flourens the cerebellum is a center of coördination and equilibrium and the nerves of the semicircular canals collaborate equally in the maintenance of equilibrium by means of their moderating action. Goltz also makes of the semicircular canals an organ of equilibrium. Later Ewald brought to light the influence of the labyrinth upon the precision of movements, and he invented a theory which I will have occasion to refer to later. I will content myself by citing the opinions of a number of the more celebrated physiologists who have made a study of the functions of the labyrinth, of the eighth pair of nerves, and of the semicircular canals. It is admitted that the motor disturbances which follow section or lesion of the eighth pair of nerves are caused by the perturbation or the abolition of the functions of the semicircular canals, of the utricle and of the saccule; that is to say, of those parts which are innervated by the vestibular nerve.

The symptoms following section of the eighth pair should be studied in cases of unilateral section and in cases of bilateral section. With the object of facilitating comparison with the disturbances consecutive to the destruction of half, or of the whole of the cerebellum, I will recall the result of my personal experi-

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ments upon the dog,[2] since it is also upon this animal that I have studied with greater detail the phenomena produced by destruction of the cerebellum.

Unilateral Section of the Labyrinthine Root is sometimes followed by a movement of rotation around the longitudinal axis, but this movement is isolated and not reproduced in series as after the destruction of half of the cerebellum.

In certain animals, such as the rabbit, unilateral section of the auditory nerve is followed by movements of rotation around the longitudinal axis. In the dog movements in a circle or like the spokes of a wheel are usually observed (Figs. 80 and 81).

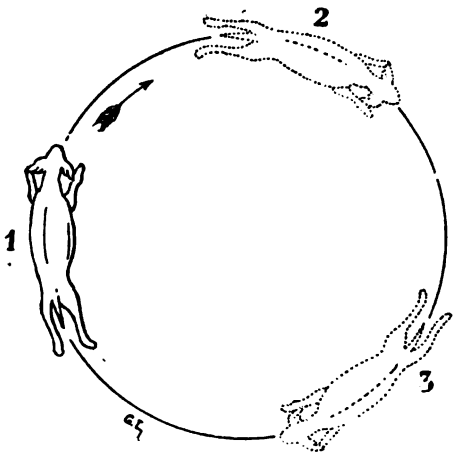

FIG. 80. Movements of rotation in a circle. Section of the right labyrinthine root in the dog.

The combination of section of the left labyrinthine root and the right cerebellar hemisphere gives rise to a peculiar movement of rotation represented in Fig. 82. The head is inclined towards the side of the section and at the same time there is a torsion, so that half of the face (on the side of the lesion) is on an inferior plane. After the hemi-destruction of the cerebellum the inclination is more marked and the torsion less so.

The deviation of the eyes is such that the eye of the injured side looks downwards and slightly inwards, the eye of the unin-

[2] These results coincide with those of other authors.

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jured side looks slightly upwards and outwards (Fig. 83). During the first few days some nystagmic oscillations are seen, which

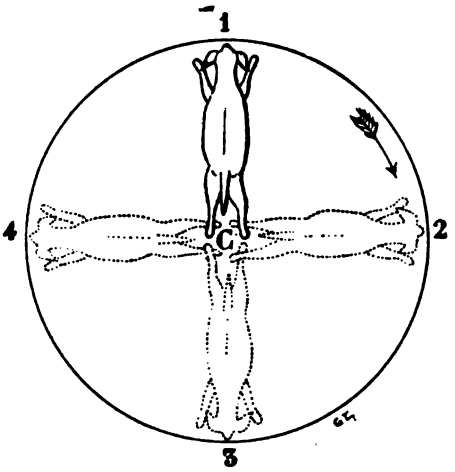

FIG. 81. Movement of rotation like the spokes of a wheel. Section of right labyrinthine root in the dog.

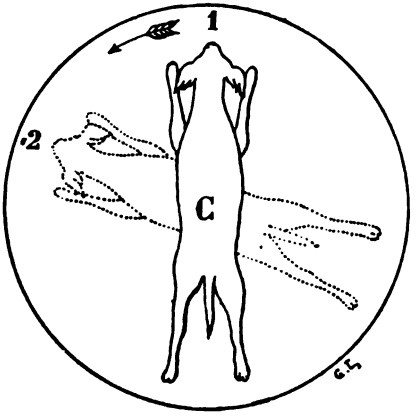

FIG. 82. Movement of rotation analogous to that of the needle of a compass. Section of the left labyrinthine root and the right cerebellar hemisphere.

have for their object the replacing of the eyeballs in their normal position.

The limbs of the side operated upon are weaker and the animal

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often sinks down with his paws bent under him. Those of the healthy side are in abduction. This is augmented when the animal tries to jump towards a person and a fall takes place upon the injured side.

If the fore paws are seized in the hand so as to make the dog walk on his hind paws, the paw of the injured side is lifted less easily from the ground and carried forward more suddenly.

The power to swim is preserved, although in the beginning

FIG. 83. Inclination and rotation of the head and of the eyes in a dog whose eighth nerve had been sectioned on the right side.

the movements are irregular and disordered, but they become normal very rapidly. The resistance to movements of propulsion, retropulsion and lateropulsion (particularly towards the operated side) is very much diminished. Placed on a movable surface he does not resist the inclination of the surface so well as a normal dog, particularly when the surface is inclined laterally and towards the side of the lesion.

Submitted to centrifuging the reactions of the head differ from those of a normal dog, particularly when the animal is turned towards the side of the lesion.

The movements in a circle, the ocular deviations, the attitudes

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of the head, and the awkwardness, attenuate progressively. The inclination of the head and the torsion are the most persistent symptoms.

After Bilateral Section of the Eighth Pair of Nerves the head oscillates in every direction: it is very mobile and does not resist movements which are imparted to it. During walking the limbs are in slight abduction, the head describes oscillations of great amplitude; this is why the animal advances in a wavy line, he walks in zigzags. The instability of the head appears to be the cause of these irregularities of gait, whereas in the cerebellar gait the whole body is displaced, at the same time, as an entity. In running the progress is interrupted by falls either to the right or to the left, or by movements in a circle.

Walking on the hind paws is difficult. The paws are raised from the ground with great pains and then thrust suddenly forward. If the animal is held so that it stands upon its hind paws in an almost vertical position and then released, it falls almost immediately backwards. During the first days it has more difficulty in seizing its food and swallows it slowly. During prehension of the food the oscillations of the head are augmented in frequency and amplitude; the same phenomenon takes place when it drinks. This muscular atony is not limited to the muscles of the head or of the neck. It may be observed in the muscles of the jaw. The mouth may be widely opened and kept open without its manifesting the slightest resistance.

It is unable to jump; placed upon a table it approaches its head near to the edge but instead of gathering itself together for a jump like a normal dog, it allows itself to fall in a lump. The hind quarters pass over the head and it turns a somersault.

The first days which follow the operation it does not seem to have an exact notion of its situation in space. Upon a young dog which had been submitted to a bilateral section of the auditory nerve I performed the following experiment: Suspended gently by the hind legs the animal sought to defend itself by raising the head, placing the front legs in extension and bending the trunk. When this experiment was repeated, after having suppressed the control of vision by blindfolding it, the animal did not attempt any movements whatever. It remained suspended in an inert mass. The same experiment repeated the first days after the operation always gave the same results (Figs. 1 and 2).

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At the end of several days the animal protects itself just as well with the eyes closed as with them open.

The descent of a stairway is impossible or very difficult. The animal is very well aware of this, and when it is pushed towards a stairway it tries to escape to one side. If it is obliged to descend it loses its equilibrium and rolls down like a ball. The ascension of a stairway is less difficult; nevertheless, it frequently falls backward.

If the animal is held above the ground and allowed to fall suddenly it falls in a heap.

All these disturbances attenuate progressively and more rapidly if the animal is constantly at liberty. But certain symptoms persist much longer. These are the awkwardness during jumping, the difficulty of descending a stairway, *and principally the impossibility of swimming,* a fact to which attention has not perhaps been sufficiently attracted. When the animal is plunged in the water it commences immediately to turn around its longitudinal axis, either from right to left or from left to right, and then sinks in the water and would drown if it were not saved. Finally, we repeated the experiments of Goltz and Ewald. These authors remarked that a pigeon deprived of its semicircular canals was no longer capable of reacting by appropriate muscular adaptations. I undertook experiments of the same kind upon three dogs, which had previously been submitted to a bilateral section of the eighth pair. With this object the animal was placed upon a plank, movable around a horizontal axis, either parallel or at right angles to this axis. The eyes were blindfolded. The reactions were then studied in the movements of inclination of the board, both slow and sudden. If this experiment were made with a normal dog and under the same conditions, it reacted by appropriate movements which were very easy to observe during the slow inclinations. These movements prevented it from falling forward or on the sides, according to its situation in relation to the axis. In the more sudden inclinations it reacted also in a manner to avoid a fall, or it jumped. If now the experiment is repeated upon the dog upon which the double section of the eighth pair has been performed, some days after the section, the normal reactions are no longer produced and a very slight inclination of the board is enough to cause the animal to fall and roll on the

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side if it is placed parallel to the axis of rotation, or it falls backwards or forwards if it is placed at right angles to this axis, the head being to the side of the inclination in the first case and the tail in the second. These reactions take place in a more marked degree as the inclination is more sudden.

This experiment has been repeated several times upon the same animal several weeks and even more than two months after the section of the auditory nerve; with the slow inclination it reacted then a little better; but a very great inclination is not necessary for the animal to tumble or roll over, as it is the first days after the section. The amelioration which is produced during the slow inclination seems to be due to a substitution by peripheral impressions, the sensations furnished by the sliding of the paws warning the animal of the modification which has taken place in its situation.

Falls upon the side or backwards or forwards are also produced when the animal is placed upon a board to which movements of lateropulsion, propulsion or retropulsion are given.

Some weeks after the operation it walks almost as well as a normal dog and keeps its equilibrium very well, either when standing or when walking.

The disturbances of equilibrium and of motility have been mentioned by several authors in patients affected by disease of the inner ear. Incoördination and the disturbances of equilibrium are a part of the syndrome described under the name of the vertigo of Menière. Van Stein has insisted upon the disturbances of static and dynamic equilibrium in diseases of the ear, and his observations have been many times confirmed. Voltolini has also called attention to these facts.

In labyrinthine otitis, as well as in cerebellar disease, the upright position cannot be maintained except with the feet spread apart—the base of support is enlarged. The patient cannot stand upon one leg. The gait is uncertain, the body being carried alternately from one side to the other. The steps are unequal and irregularly spaced. Muscular energy is very much diminished and fatigue ensues rapidly. The labyrinthine ataxia differs however from the cerebellar ataxia. The sign of Romberg is the rule. The variations of the attitude of the head augment considerably the disturbances of equilibrium. The mus-

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cular weakness is more pronounced, and, moreover, when the patient is subjected to passive movements of rotation or translation, the orientation of these movements is no longer perceived; the nystagmus and rotatory vertigo, which appear in a normal individual after rotation around the longitudinal axis, have disappeared. The passage of a galvanic current through the skull, in the line of the two ears, no longer provokes nystagmus or ver-vertigo.

Disturbances of equilibrium have been noted in deaf mutes, although it is true they are less pronounced, only in the rough. James observed that in some of them orientation in the water was impossible, and if left to their own devices they would drown. Animals in which the two auditory nerves have been sectioned have the same inability to direct and orient themselves in water (Ewald, André-Thomas). Whereas, for animals deprived of the cerebellum swimming is still possible (Luciani, André-Thomas).

In birds the horizontal, sagittal and vertical canals may be suppressed at will, and thereby abnormal attitudes of the head produced, varying according to the canal injured, also troubles of motility, and movements in a circle. When all the canals are cut, the head oscillates in every direction, like a pendulum, and the animal is no longer able to stand upright (Flourens).

Finally, between the disturbances produced by section of the eighth pair of nerves, and those produced by destruction of the cerebellum, there exist analogies and differences. It seems that the first condition gives rise to defective attitudes of the head, and that the disturbances of equilibrium are due to disorientation of the head. The musculature of the head is, however, not alone in question. The musculature of the limbs and the trunk is also disturbed.

The vestibular apparatus, and by this general term we must understand the semicircular canals, the utricle and the saccule, advises us as to the attitude and progression of our body (otoliths of the saccule and the utricle), and as to the rotation of the head (movements of the endolymph in the semicircular canals) (Breuer, Ewald). But it seems to have other functions; Ewald was struck by the diminution of muscular force and the lack of coördination of certain movements in the animals upon which he

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operated; the muscles contracted either too slowly or too late. He admits the tonic influence of the labyrinth upon the musculature, the existence of a labyrinthine tonus. After suppression of the labyrinth, there would be a considerable diminution of muscular energy, and the muscles most effected are those which have need of precision in the accomplishment of their functions. Thus, in pigeons, after the destruction of the labyrinth, there was no disturbance in the functioning of the muscles of the legs during walking, whereas, in cockatoos, who use the muscles of the legs and the feet to seize their food and to climb, there was a very marked disturbance.

The labyrinth, according to Ewald, reacts upon all of the muscles, but each labyrinth is particularly in relation with the muscles of the opposite side, which move the vertebral column and the head (muscles of the back of the neck, of the neck, and muscles which go from the body of one vertebra to the transverse processes of the vertebra above). As to the muscles of the extremities, each labyrinth is in relation with the extensors and abductors of the same side. All the muscles of the eyes, with the exception of the external rectus (?) seem to depend principally upon the homonymous labyrinth.

In conclusion, the continual excitations which come from the labyrinth are transmitted to certain nervous centers, which reflect them in their turn to the muscles, in which they augment the tonicity, a tonicity which is accompanied by modifications in the terminal organs of the sensory nerves of the muscles. This labyrinthine tonus, when it begins to disappear, results at the same time in modifications of tonus and muscular sensibility. This is why the movements become less energetic, and less precise.

What are the nerve centers that govern the labyrinthine tonus? The resemblances noted above between the cerebellar symptoms and the labyrinthine symptoms allow us to suppose that the cerebellum is the principal of these centers. Goltz has already advanced the hypothesis that the cerebellum is the center of perception of attitudes of the head. The proximity of the cerebellum, and the nuclei of the vestibular nerve, support this opinion. Luciani has returned recently to this subject, and he assimilates almost completely the phenomena which are manifested after the destruction of the labyrinth, and those which follow the de-

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struction of the cerebellum. The destruction of either one or the other has for consequence a diminution of tonus; this is one of the points upon which the Florentine physiologist has most insisted, and he compares the cerebellar tonus with the labyrinthine tonus. He pushes too far the resemblance between the cerebellar symptoms and the labyrinthine disturbances. The muscular weakness in fact is much more marked after the destruction of the labyrinths. "At Naples, Ewald saw some sharks which required four vigorous arms to hold them, and were held by a single hand after the section of the auditory nerves; nevertheless, after the removal of large portions of the cerebellum, which constituted a much graver operation, this muscular enfeeblement did not take place" (Kœnig).

The cerebellum is not a center of perception for labyrinthine excitations. Submitted to centrifugation, individuals affected with atrophy of the cerebellum perceive the movements of rotation very well, the reverse of those affected with labyrinthine otitis. The fibers of the vestibular root lose themselves almost entirely in the medulla, in the nuclei of Deiters, Bechterew, and in the triangular auditory nucleus. The fibers which go to the nucleus of the roof are very scanty. Luciani therefore commits an error in affirming that the labyrinth acts upon the centers through the intermediation of the cerebellum. There are, nevertheless, important connections between the labyrinthine apparatus and the cerebellum, but they are of another order. The central gray nuclei of the cerebellum, the nucleus of the roof, the globulus, and the embolus, and perhaps also the dentate nucleus, give rise to fibers which terminate in the three vestibular nuclei (nucleus of Deiters, nucleus of Bechterew, and the triangular auditory nucleus, see anatomy). The greater number of these fibers are apparently direct, though some are crossed (Fig. 84). The result is an anatomical disposition altogether unique, and the activity of the vestibular nuclei may be brought into play, either by labyrinthine excitations, or by cerebellar excitations. One can easily conceive, therefore, that the suppression of one or the other of these sources of excitation should have in both cases very comparable results, but not identical ones, for the excitations are not of the same nature, and the relations of each category of fibers with the cells of these three nuclei are probably not the

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same. It appears to be demonstrated that the vestibular apparatus contributes to assure the maintenance of equilibrium of the head and of the trunk in passive movements. Does the cerebellum govern, in its turn, equilibration in active movements (voluntary,

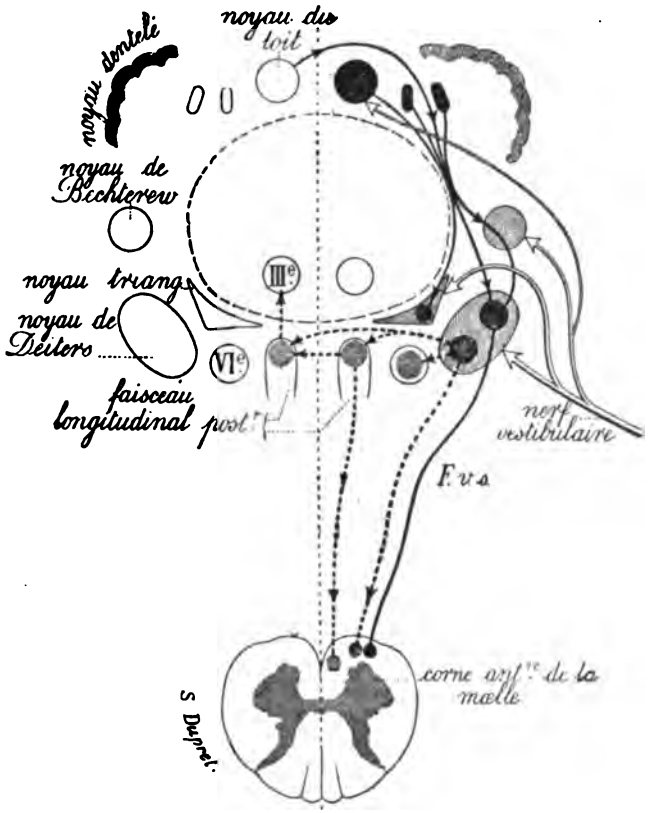

FIG. 84. Diagram representing the relations of the central nuclei of the cerebellum with the nuclei of the vestibular nerve, the oculo-motor nuclei, and the spinal cord. (This diagram redrawn according to my direction is borrowed from the work of E. J. Moure and Couzard upon the functional examination of the labyrinth, 1909.)

automatic and reflex)? This seems to be none the less solidly established. It does not seem, however, that it exercises this function entirely by itself to the exclusion of the vestibular apparatus.

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One can represent in a different manner the physiological relations between the cerebellum and the labyrinth. The cerebellum has a moderating action in regard to the reflexes provoked by the vestibular apparatus (in moderating the reflex tonus through the intermediation of the nucleus of Deiters), the same as it has towards the cerebral impulsions (Adler). The cerebellum has, therefore, an action antagonistic to the cerebrum. When the vermis is destroyed, or the bundles which unite the nuclei of the eighth pair are interrupted, the vestibular apparatus works without a brake, its reactions are exaggerated and cerebellar ataxia is the immediate consequence. In the same way if the cerebellum is no longer in anatomical and physiological connection with the cerebrum, the involuntary movements become disordered. According to the conception of Adler the influence of the cerebellum is, above all, inhibitory.

Is there Reason to Distinguish Two Organs in the Cerebellum—the Cerebellar Cortex and the Central Gray Nuclei?

Anatomically and histologically the cerebellar cortex presents itself with a structure and character so special that it constitutes an organ highly differentiated, and very distinct from the central gray nuclei. In the cerebellum, as in the cerebral hemispheres, the cortex and the central gray nuclei are looked upon as distinct organs.

Between the cortex and the central gray nuclei (dentate nucleus, nucleus of the roof, globulus and embolus), there are intimate relations through the intermediation of the projection fibers. They take their origin in the cerebellar cortex and terminate in the nuclei (André-Thomas). One can, therefore, represent the cerebellar cortex as the point of departure of the excitations which will transform themselves into tonic variations by passing through the central gray nuclei and the centers with which they are in connection.

Physiologically, the cerebellar cortex comports itself differently from the central gray nuclei. The destructions of the cortex are translated by symptoms which are less grave, and less enduring, than those destructions which affect the deeper organs.

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The cerebellar cortex is not excitable, whereas the central gray mass is (Horsley).

Horsley and Clarke have shown besides that the cortex and the nuclei have a very different influence upon the contractures of animals which have been decerebrated. In a first group of experiments these authors sectioned the mid-brain in a dog and produced a generalized rigidity which was due to the interruption of the cerebral influx. In removing, by successive layers, the cerebellum, these authors noted that this hyper-tonicity did not commence to recede until the moment the section intersected the intrinsic nuclei, and the para-cerebellar nuclei (probably the nuclei of the vestibular nerve). In another group of experiments, they separated by a massive horizontal section, the dorsal half of the cerebellar cortex, and three weeks later they sectioned the mid-brain. In this case, the rigidity of the decerebrated animals did not differ from that of normal dogs.

The cerebellar cortex, therefore, is not indispensable for the maintenance of contracture, and the principal source of the motor impulses of the rigidity is the central gray nuclei and the para-cerebellar nuclei. (Thièle arrived at the same conclusions.) According to Horsley and Clarke, the cerebellar cortex is a receptive center of impressions from the trunk and from the limbs of a special character, always coördinated.

According to Sherrington, the contractures consecutive to decerebration can be inhibited by the excitation of the anterior surface of the cerebellum. Faradization of this region is followed by a relaxing of the muscles of the neck, the head, and the hind legs, more particularly on the side of the excitation. This author thinks that the cerebellum has an inhibitory influence.

Do Localizations Exist in the Cerebellum?

This question should be studied separately for the cerebellar cortex, and for the central gray nuclei.

One can only accept with great reserve the results obtained by excitation of the cerebellar cortex, since the excitability of the cortex is disputed, and even denied by some physiologists, such as Horsley and Clarke. As to the destructions of the cortex, they generally only give rise to temporary disturbances unless they

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are widespread. Some authors maintain, however, that they have obtained very localized symptoms by the destruction of very limited regions of the cortex.

After the destruction of the most internal portion of the crus primum (terminology of Bolk), Marassini observed abnormal movements of the front leg of the same side. They were lacking if this region remained uninjured, even when the lesion of the lateral lobe was more widespread. The destruction of the most internal portion of the crus secundum and of the paramedian lobe is followed by abnormal movements of the hind leg of the same side.

Von Rynberk observed also disturbances of motility in the front legs, which were realized constantly and exclusively when the crus primum of the anciform lobule was destroyed. The concomitant lesion of the lobule simplex only caused an increase of the intensity and the duration of these effects. There exists a center for the muscles of the neck in the lobule simplex: a localized lesion of this level has, for a consequence, rotatory instability of the head.

After destruction of the ansiform lobule in the goat, Vincenzoni did not observe any anomaly, but if the lobule simplex were simultaneously destroyed he observed ambulatory dysmetria ("gait of a cock"), in the anterior homolateral limb. The resection of the lobule simplex in which he got no results from the dog, had, as a consequence, a complete but temporary suppression of locomotion. With the suppression of the paramedian lobe, movements of rotation around the longitudinal axis appeared. The doctrine of cerebellar localizations is also accepted by Hulshoff Pol, and by Rothmann. According to Hulshoff Pol the suppression of the posterior median lobe in the dog gives rise to incoördination in the hind limbs; that of the paramedian lobe, besides ataxic symptoms, pleurosthotonus and peculiar gait, which he calls the "walk of parade." After destruction of the crus secundum of the ansiform lobe he observed ataxia and the "gait of a cock."

The experiments of Rothmann were made upon the dog and the monkey. The unilateral resection of the quadrangular lobe (lateral segment of the lobule simplex and crus primum of the ansiform lobule) in the dog, was followed by a disturbance in the

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position of the front leg of the same side. The paw was held to one side and behind its normal position; the fore paw was turned over and the animal did not draw it back when it hung over the edge of the table. Disturbances of the same type occurred in the hind leg after destruction of the crus secundum of the ansiform lobule, which corresponds to the semilunar lobe. In the monkey, lesions limited to the cortex of the quadrangular lobe occasioned disturbances limited to the homolateral anterior limb. Movements of the hand and the fingers were awkward, and were accompanied by a fine tremor, and the arms were put into an exaggerated flexion. These phenomena diminished gradually, but still persisted at the end of a month. They were more marked in both limbs when the two quadrangular lobes were destroyed. Locomotion remained unaffected. When the destruction was carried to the semilunar lobe, similar disturbances appeared in the posterior limbs.

The authority of the physiologists who have made these experiments gives them a real value; and although the results do not absolutely agree, they favor the idea of functional localizations in the cerebellar cortex. We must await the confirmation of these results by new researches.

As to the central gray nuclei they could be decomposed into special centers, if one takes into account the experiments of Clarke and Horsley cited. One may remark, however, that the excitation of the central gray substance of the cerebellum is a very difficult experiment to perform, and that it is very difficult to say from which of the nuclei of the cerebellum, and of the neighboring nuclei, the excitation comes.

It is necessary to make some reservations as to the existence of precise localizations in the cerebellar cortex—only taking into account the results of experiments. One cannot affirm the functional unity of the cerebellar mantle. On the contrary, anatomical facts permit us to suppose that the vermis and the hemispheres have, in relation to one another, a certain independence. The vermis is phylogenetically older than the lateral lobes. It represents, in a way, the primitive cerebellum, the cerebellum of the animals whose brain, or, rather, whose cerebral cortex is still rudimentary, and in whom the movements of the limbs are still only slightly differentiated. The lateral lobes are altogether

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rudimentary in certain birds, and in reality do not make their appearance except in mammals, and for each species they are developed according as it occupies a higher place in the animal scale. They attain a maximum importance in those animals whose cerebrum itself is very highly developed, and the movements of whose limbs is the most differentiated.

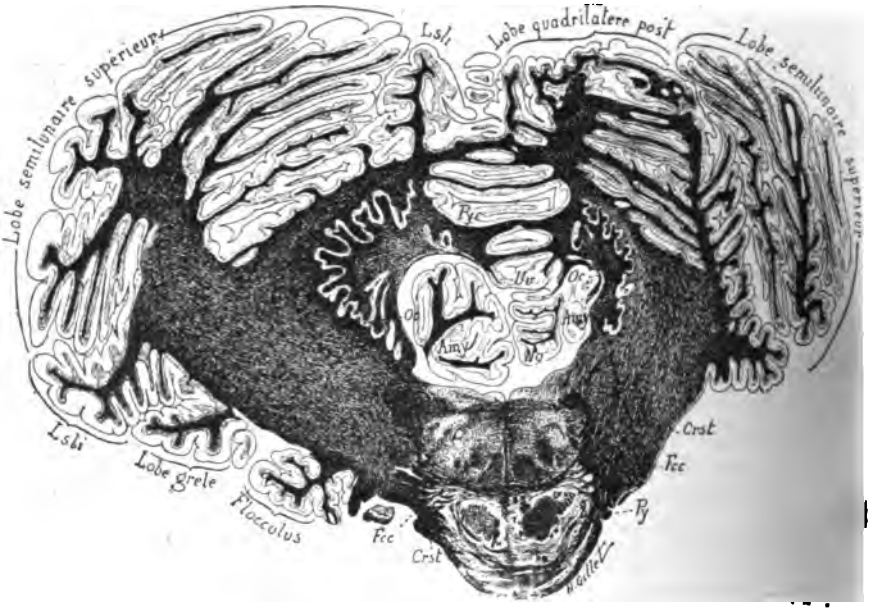

FIG. 85. Vertico-transverse section of the pons and the cerebellum, in a case of crossed atrophy of the cerebellum due to a lesion of the right cerebral hemisphere dating from infancy. To the right the path of the crus cerebri is degenerated (*PY*). On the left it is intact. The atrophy of the left cerebellar hemisphere affects the convolution of the lateral lobe, the white substance, and the cerebellar olive. The central bundle of the tegmentum (*Fcc*) is atrophied on the right. In this case there was an atrophy of the medullary olive on the right. (Consequently crossed in relation to the cerebellar atrophy.) (Thomas and Cornélius, *Revue Neurologique*, 1905.)

When the cerebral cortex is destroyed over a large area of the motor zone, and particularly when the optic thalamus is at the same time injured or atrophied, a crossed hemi-atrophy of the cerebellum results (Figs. 85, 86 and 87). This hemiatrophy is

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very frequent when the cerebral lesion dates from infancy (and in this case not only the cortex is atrophied, but the cells of Purkinje are lacking in the corresponding regions); this may be found also in the adults (Figs. 88 and 89), but less constantly, and in a less marked degree. It has been observed in animals which have suffered grave cerebral mutilations during the first weeks of their lives (Von Monakow). The crossed hemiatrophy of the cere-

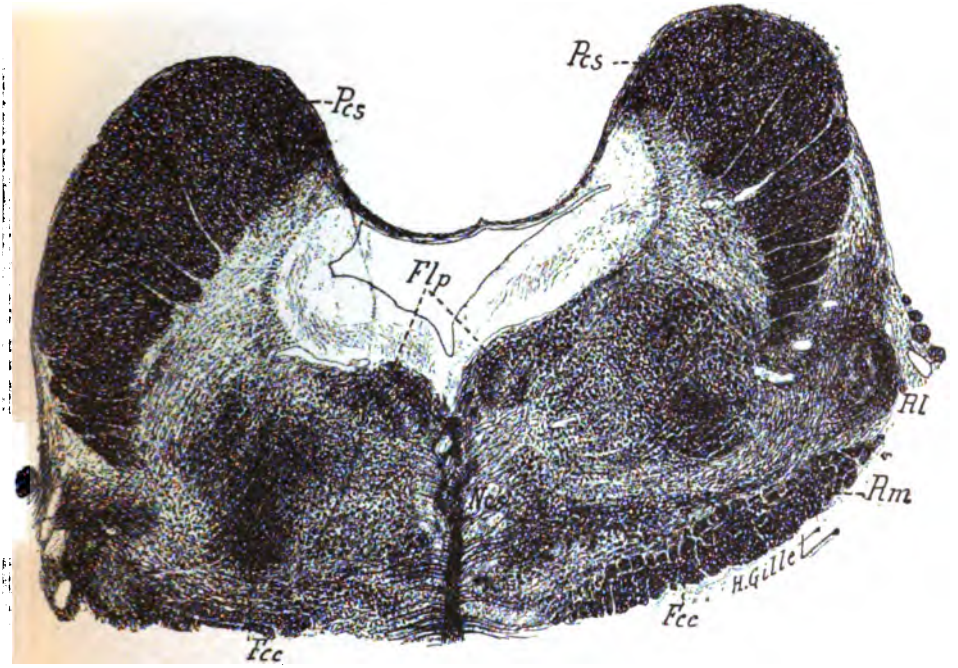

FIG. 86. Transverse section of the tegmentum pontis in a case of crossed atrophy of the cerebellum due to a lesion of the cerebral hemisphere dating from infancy. Atrophy of the left cerebellar peduncle (*Pcs*).

bellum affects the lateral lobe of the cerebellum and respects the vermis (André-Thomas and Cornélius). In the lateral lobe it has a certain predilection for the quadrilateral lobe.

The atrophy of the superior cerebellar peduncle can be followed as far as the dentate nucleus even in adults. It depends upon the atrophy of the optic thalamus. The atrophy of the cerebellar cortex, of the middle cerebellar peduncle, and the white

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substance, is the consequence of the degeneration of the peduncular paths, and its interrelation with the gray substance of the pons.

The pathogenesis of crossed hemiatrophy has been very much debated. Some have attributed it to a functional inactivity, others to a secondary transneural atrophy. Against the first theory the fact may be invoked that crossed atrophy of the cerebellum is rarer and less marked in the adult than in the child, whereas, the functional activity of the cerebellum should attain its maximum in the first case.

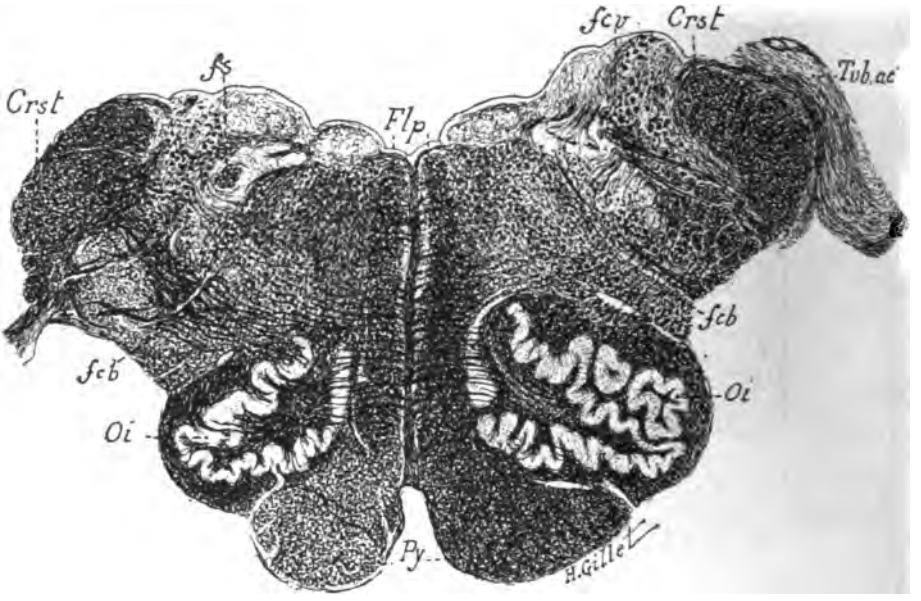

FIG. 87. Transverse section of the medulla. In a case of crossed atrophy of the cerebellum dating from infancy. Crossed atrophy of the medullary olive (*OI*) (see Figs. 85 and 86).

The explanation is of little importance. The main point is, the intimate association of each cerebral hemispere with the cerebellar lobe of the opposite side, and the subordination of the latter to the former. The cerebral cortex of the fronto-parietal and temporal regions is projected upon the cortex of the opposite lateral lobe of the cerebellum, and slightly also upon the homo-

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lateral lobe, by the intermediation of the cerebral crus and the pontine nuclei, while the spino-medullary centers are projected upon the cortex of the vermis. The efferent fibers of the vermis are exclusively directed to the terminal nuclei of the vestibular root of the auditory nerve, and by their intermediation to the medulla and the spinal column; the efferent fibers of the hemispheres go partly to the red nucleus, and partly to the thalamus, and the thalamus transmits their excitations to the cerebral cortex. This is why, basing oneself upon comparative anatomy, normal anatomy, and pathological anatomy, we must consider the vermis and

FIG. 88. Atrophy of the right crus cerebri (*P*), and of the pyramid (*Py*). Atrophy of the left cerebellar hemisphere. For the other indications see the figures in the chapter on anatomy.

the lateral lobes as functionally different regions, not having the same attributes. We are able therefore to distinguish two systems: The cerebro-cerebellar, or hemispheric system, and the medullo-spino-cerebellar or vermian system. We must consider all the lessions seated in the paths of the first system, as having manifestations of the same kind, as would all the lesions seated in the paths of the second system. In future attention should be drawn to this point.

Whatever it may be, the activity of each cerebellar hemisphere is intimately connected with that of the opposite cerebral hemisphere; whereas, that of the vermis is subordinated to that of the

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spinal column and the medulla. Perhaps, also, one might maintain that the vermis and the hemispheres have an identical function, varying in its intimate mechanism according to the type of animal considered. The appearance and the development of the cerebellar hemispheres are only witnesses of the subordination of the inferior centers to the cerebral influence in superior vertebrates; nevertheless, anatomy teaches that in this class of animals there is a manifest independence between the vermis and the hem-

FIG. 89. Crossed atrophy of the cerebellum in a case of cerebral hemiplegia in an adult. Above the superior surface. Below the anterior surface.

ispheres (Horsley and Clarke). This is why it seems more probable that the vermis and the lateral lobes do not have absolutely identical functions. The first would be more particularly related to the functions of equilibration, and the second to the functions of regulation.

SUMMARY

Among the results of experimental and clinical investigation, we must distinguish a group of concordant and a group of discordant facts.

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The first group consists of the phenomena produced by the destruction of the organ. The second group of those produced by its excitation. This last group should be again studied before we can make any definite physiological deductions.

The symptoms following the destruction of the cerebellum are above all disturbances of motility, whether the movement is reflex, automatic or voluntary.

The motor perturbation affects not only each movement considered alone but also the association of movements, or better, the motor synergies.

Each movement, isolated by itself, is not incoördinate as in locomotor ataxia. It is characterized by dysmetria and discontinuity. When the movement relates to the maintenance of an attitude, there is instability or astasia.

The disturbances of the motor synergies are particularly manifested in tonic reactions applied to the maintenance of equilibrium. There is a perturbation of the reactions of equilibration. The cerebellum perfects and accelerates the reëstablishment of equilibrium, in the same way that it renders movement precise and regular.

The cerebellum assures the measure and the continuity of movement, stability, and the reactions of equilibration by a special tonic action. This regulatory action is governed partly by the cerebrum, and partly by peripheral excitations, but it is not a center of conscious sensibility.

We cannot but look upon the action of the cerebellum on muscular tonus, and on the centers, as braking or inhibitory, rather than excito-motor. It is probably either one or the other. Is not the cerebral cortex at the same time excito-motor and inhibitory (Hering and Sherrington)? By the excitations of the cerebral cortex have not physiologists obtained at the same time contractions of certain muscles and inhibition of the tonus of their antagonists?

Contrary to the cerebrum, the influence of the cerebellum is exercised principally upon the muscles of the same side of the body.

In the same way as after the suppression of the cerebellum, the motility of the limbs is not abolished, so the function of equilibrium is not definitely lost. It may be reacquired, in a certain measure, thanks to cerebral and labyrinthine substitutions.

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The existence of individualized centers of differentiated or coördinated movements in the cerebellum, is not yet absolutely demonstrated, but researches in this line up to now are rather favorable to this hypothesis. One must distinguish two organs in the cerebellum, the cortex and the central gray nuclei. In the cortex we must admit a certain function of independence between the vermis and the hemispheres. The same is the case for the various central gray nuclei.

The vermis, or primitive cerebellum, is principally in relation with the inferior centers (spinal, medullary, pontine); the hemispheres with the superior centers (cerebral cortex, central ganglia of the cerebrum). The action of the cerebellum may be exercised either through a reflex path (nucleus of the vestibular nerve, red nucleus), or through the intermediation of the cerebrum (superior cerebellar peduncle and thalamo-cortical fibers).

The vermis, the relations of which are very intimate with the nuclei of the vestibular nerve, is more particularly adapted to the regulation of the coördinations upon which the equilibrium and the station of the body depend; the hemispheres to the regulation of voluntary movements.

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NERVOUS AND MENTAL DISEASE MONOGRAPH SERIES NO. 23

THE SIGNIFICANCE OF PSYCHOANALYSIS FOR THE MENTAL SCIENCES

BY

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NEW YORK

THE NERVOUS AND MENTAL DISEASE PUBLISHING COMPANY

1916

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Edited by

Drs. SMITH ELY JELLIFFE and WM. A. WHITE

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PREFACE

In the following pages, which take up the applicability and significance of psychoanalysis for the mental sciences, the subject can be treated in only the briefest form: neither its evolution nor the extensive body of facts on which its conclusive force rests, can be considered. The degree, however, in which the particular mental sciences are treated by us bears no relation whatever to the cultural importance of these but only to the number of points of contact with psychoanalysis which have thus far been demonstrated. This is determined on the one hand by the share which the unconscious has in the mental products of humanity, on the other hand, by the comparative youth of our science and further by external and accidental influences.

Thus, our attention was directed principally to the outlook for the future in which the question of method which will be applicable to the stating and solution of the problems seemed the most important. In the endeavor to carry out this principal object, we sought to supplement our study of the individual problems, the elaboration of which we have striven to further in the magazine Imago edited by us under the direction of Professor Freud.

Instead of interrupting the text by particular citations and references to the literature, we refer here once and for all to the fundamental writings of Freud (ten volumes have appeared from F. Deuticke in Vienna and S. Karger in Berlin) as well as to the compilations and periodicals edited under his direction, in which the articles belonging to our subject and the other psychoanalytic literature are to be found.

THE AUTHORS

VIENNA,
Easter, 1913

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"Car tous les hommes désirent d'être heureux, cela sans exception. Quelques différents moyens qu'ils y emploient, ils tendent tous a ce but. Ce qui fait que l'un va à la guerre, et que l'autre n'y va pas, c'est ce même désir qui est dans tous les deux accompagné de differéntes vues. La volonté ne fait jamais la moindre démarche que vers cet objet. C'est le motif de toutes les action, de tous les hommes, jusqu'à ceux qui se tuent et qui se pendent."—Pascal: Pensees sur L'Homme.

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CHAPTER I

The Unconscious and its Forms of Expression

The foundation on which the whole of psychoanalysis rests is the theory of the unconscious. Under this, however, is not to be understood a term derived from abstract thought nor merely an hypothesis created with the aim of establishing a philosophic system; with the significance, for example, which Eduard von Hartmann has given the word, psychoanalysis possesses no connection at all. The negative peculiarity of the phenomenon appearing in the term, namely, the absence of the quality of consciousness, is indeed the most essential and most characteristic one, but not, however, the only one. We are already familiar with a whole series of positive distinguishing features which differentiate the unconscious psychic material from the rest, the conscious and foreconscious.

An idea which at a given moment belongs to the content of consciousness of an individual, can in the next moment have disappeared; others, emerging later, have appeared in its place. Nevertheless, the idea still retains a permanent relation to the conscious mental life, for it can be brought back again by some kind of connected association chain without the necessity of a new sense perception; that is to say, in the interim, the idea was removed from the conscious mental life but still remained accessible to the mental processes. Such ideas, which indeed lack the quality of consciousness, the latter being every time recoverable however, we call the foreconscious and distinguish this most explicitly from the real unconscious.

The real unconscious ideas are not, like the foreconscious ideas, temporarily separated from the conscious mental life, but are permanently excluded from it; the power to reënter consciousness, or stated more exactly, the normal waking consciousness of the subject, these ideas lack completely. As the state of consciousness changes, so also does its condition of receptivity.

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After such transformations as are brought about, for example, by the condition known to neurologists as "condition seconde" and also by hypnosis and to a certain extent also by sleep, there becomes accessible to the subject a flood of psychic material, phantasies, memories, wishes, etc., which was until that moment unknown to him. That these products are occasioned by the change in consciousness is with some of these, for example memories, excluded à priori. With others, the conclusion may be reached from observing their effects that they must have been previously present in the unconscious.

In everything which comes to view from the unconscious on such occasions, experience has shown the constant repetition of certain common characteristics. To these characteristics, belong in the first place a world of affect of uncommonly high intensity and further a persistent attempt to encroach on the conscious mental life; this encroachment is explained by the principle that every affect and the idea invested by it has a natural tendency to appropriate as great a part of the mental life as possible as a consequence of those affective forces. If to every state of consciousness, there corresponds a definite condition for the admission or rejection of ideas, then this condition can be imposed and executed by nothing else than an energy acting in psychic affairs which excludes from consciousness the ideas which displease it or represses those ideas already there. The effect of a force is counteracted only by another equally strong or superior force opposed to it; the psychic processes which we can observe are thus the results of dynamic relations which are to be inferred from them. We have before us the picture of a strict gatekeeper who slams the door in the faces of uninvited guests. Since an affect which is present exercises not a momentary but a lasting activity, it is also not destroyed by a single repulse. Rather, there must be established a perpetual frontier guard; that is, in other words, a permanent interaction of forces, as a result of which, a certain psychic tension becomes inseparable from our mental life. That energy, the function of which is to protect consciousness from the invasion of the unconscious, we call, according as it appears in aggressive or defensive form, repression or resistance.

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We have witnessed a conflict between two psychic forces and must now ask ourselves whence the hostility between these forces arises. To what peculiarities, do the unconscious ideas owe the fact that the quality of consciousness is withheld from them with such stubbornness? Wherein rests their incompatibility with the other psychic forces?

It might at first be open to question whether there are such general characteristics. The exclusion from conscious mental life depends, as we have seen, upon the attitude of consciousness present in such a case and as this attitude varies, the unconscious must likewise change too, quite apart from the individual difference of the content of consciousness conditioned upon differences of experience. On the contrary, we may refer to the fact that the fundamental tendencies belonging to the conscious mental life are as a whole constant and change only slowly and unnoticeably from epoch to epoch. In their conception of the external world, the members of a civilized society hold the essentials in common, no matter whether this conception ultimately centers in a religious, moral or philosophical view of the world. In spite of all the progress in the control of nature, the human race has developed so little in regard to mind during thousands of years that we may consider the whole of civilized humanity and also that of antiquity as a great unit. The important transformations we will become acquainted with in the individual investigations; in the collective picture, these transformations recede, especially if we compare the picture with that of those who stand outside of civilized society. The position of primitive man, of the so-called savage, toward the external world is fundamentally different from ours; further, in the relation between conscious and unconscious which exists in his mental life, important deviations may be conjectured.

Thus in spite of the great individual variety of the unconscious, it is not arbitrary and lawless but definitely established with regular, constantly recurring characteristics which we must learn to recognize so far as they have already been investigated.

Our first question will naturally concern the origin of the unconscious. Since the unconscious stands completely foreign and unknown to the conscious personality, the first impulse would

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be to deny connection with consciousness in general. This is the manner in which the folk-belief has ever treated it. The bits of the unconscious which were visible in abnormal mental states passed as proof of "being possessed," that is, they were conceived as expressions of a strange individual, of a demon, who had taken possession of the patient. We, who can no longer rely on such supernatural influences, must seek to explain the facts psychologically. The hypothesis that a primary division of the psychic life exists from birth, contradicts the experience of the continual conflict between the two groups of forces, since if the separation were present from the beginning, the danger of a shifting of boundaries would not exist. The only possible assumption, which is further confirmed by experience, is that the separation does not exist à priori but originates only in the course of time. This demarcation of the boundary line must be a process which ends before the complete attainment of the normal level of culture; thus, we may say it begins in earliest childhood and has found a temporary termination about the time of puberty. The unconscious originates in the childhood of man, which circumstance affords the explanation for most of its peculiarities.

We recognize in childhood a forerunner of the age which is capable of reason and this of course is a right view in many relations. Besides that part of the mental life which we carry over from childhood into later life, there remains however another part, the real childish, with which we afterwards have nothing more to do and which we therefore forget. Only thus are explained the great discrepancies which every person displays in his childhood memories and these exactly at a time in which he knew quite well how to consider and estimate events. Almost everyone remembers of his earliest years of childhood only isolated details of indifferent scenes while he has totally forgotten those incidents which were the most important at the time. The purely infantile mental powers which are not embodied in the consciousness of the adult cannot however be lost. In psychic affairs as in the physical world, the law of conservation of energy holds good; the infantile, which was repressed from the conscious mental life, did not disappear but formed the nucleus about which the unconscious mental life crystallized.

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In what point does the adult differ so fundamentally from the child that the mental states of those developmental epochs have become quite useless for him? That this point is the sexuality will probably awaken universal contradiction, for sexuality normally begins, we are assured, with puberty and can thus create no typical infantile psychic phenomena.

The fact of normal childish sexuality, among forms of activity of which, only the onanism of the suckling may be mentioned here, is so easily demonstrable by everyone who comes into close contact with children, such as physicians, nurses and parents, that their stubborn denial of this phenomenon cannot be considered as an objective opinion but only as the result of just that repression process which will not allow to be brought again before consciousness the elements of the ego which have become first worthless and then obstructive to its own development. It would be very surprising if so important a source of affect as the instincts belonging to the domain of sexuality, which we class together under the general term "libido," first made their appearance suddenly, upon the attainment of a certain age. As a matter of fact, the libido has been present from the very beginning, only before puberty the phenomena of the instincts belonging to it find outlet neither in the form of sexual expression of the adult nor in a simple unified direction; rather, each component instinct strives toward its own goal independently of the others; this aim has no similarity to the later sexual aim, the sexual act.

Also, during childhood, we distinguish different phases of development, but of these, only the most important can be mentioned here. The first phase embraces that period when the child, in its knowledge of the external world, has not yet acquired the conception of its own personality as something differentiated from the world. In this period, the child seeks to gain sexual pleasure on its own body (autoerotism). Besides the genitals, all possible parts of the body are taken into consideration, especially the lip zone, which can be stimulated by "pleasure sucking" and the anal zone which can be stimulated by the retention of fecal masses.

The decisive transition point is formed by a stage which is

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normally interposed between the period of autoerotic activity and that of love of an object; out of consideration for the pathological fixation of this transition stage to be observed later, we designate it as "narcissism." Narcissism is characterized by the fact that the libido, which, in contrast to the ego instincts, finds from the very beginning its autoerotic gratification on various parts of the body, having now become unified, has for the time found its object in its own self considered as a whole. In a certain measure, the man is narcissistic even if he has found external objects for his libido; the degree of this attitude is of tremendous significance for the development of the character and personality.

The next phase shows the "love of an object" but this love develops under peculiar conditions. The significance of an exclusively sexual organ comes to the genitals only with the later evolution which concludes with puberty. The exclusive sexual aim of normal, sexually mature persons connected with this sexual evolution does not yet come into consideration; in its place, there appear according to the instinctive tendencies, various forms of gratification: sexual curiosity and pleasure from undressing, the infliction and endurance of pain, etc. Thus, that condition, which, occuring in unchanged persistence in an adult would constitute a perversion (exhibitionism, peeping, sadism, masochism) forms an expression of the normal sexuality of childhood.

Also, the sexual objects appearing in this second phase of infantilism are essentially different from those of the adult. The relatively minor importance of the genitals for the sexual relation directed toward other persons and the ignorance of the differences in structure and function of the male and female sexual apparatus, render it impossible for the child to take into consideration the distinction of sex in the consummation of his erotic relations. Further, apart from this fact, the child's love is most frequently directed toward those persons who would not be so thought of by mature cultured people, namely, the members of his own family, especially the parents and also the nurses as substitutes for the parents.

He who takes offence at the statement that the first inclina-

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tions of a person are regularly incestuous, should be reminded that the childish eroticism, even if it is ever so strong in affect, is accustomed to express itself only with limited aim in the harmless form of affection. For the child growing up in the bosom of the family, other relations of the same intimacy are inconceivable and also for the parents, it has ever been considered the most beautiful privilege that the first affection of their children should be directed toward them. Soon, the child begins to show a preference for one of the parents and indeed usually, since the attraction of the sexes applies also to the relation between parents and children, for that parent of the opposite sex, by whom it is itself considered with especial tenderness. With the other parent, often also with the brothers and sisters, the child easily comes into a relation of rivalry, since it wishes to share with no one; besides love, there then appears hostility and the fervent wish for the elimination of the rival.

Then, in the period of puberty, the genital zone attains its primacy, the individual instincts lose their independence and arrange themselves for the purpose of attaining the normal sexual aim. Certain ones, as the instinct for mastery in the male, find their gratification in the sexual act itself; others, for example, the instinct for looking (Schautrieb), by affording the forepleasure, serve the purpose of creating the tension which prepares for the sexual act and brings about the end-pleasure. In addition to the renunciation of the isolated gratification of these partial instincts, the erotic inclination toward the members of the family must also be abandoned; sexuality adapted to a new aim is demanded; further, another object outside the family must be found, all of which transformations normally come to successful accomplishment after some groping attempts.

Thus, for him who has puberty behind him, sexuality is nothing new; further, he must also forego some of the hitherto customary modes of gratification, in particular the sexual pleasure derived from his own body as object and the incestuous fixation on his nearest relatives. If one of the component instincts was especially strongly developed, it will not receive sufficient satisfaction under the new regime.

Just as little as the libido appears in the mental life as some-

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thing new, even so little can it again disappear from the same. Every striving toward the attainment of pleasure is indestructible. The libido can change its form under the influence of internal or external forces but the instinct will constantly be nourished from its old sources. If, under such a change, a gain of pleasure is sacrificed in part or in whole, because in the changed form, the instinct no longer finds adequate possibility for gratification, this instinct nevertheless still continues its existence and with its impetuous demands for the old pleasure, becomes a dangerous enemy of the new order of things.

The result of this relation would be a never-ending conflict; consciousness, which in the service of the control of reality, should be directed toward impressions coming from the external world, might be completely engrossed in the endopsychic perception of this struggle and the psychic economy permanently disturbed. Only the repression of the overpowering forms of gratification of instinct from the visual field of consciousness makes it possible to keep consciousness open for sense perceptions and the mind in equilibrium. The mechanisms employed in this task we shall soon examine.

The phenomena which we have thus far recognized form only the nucleus of the unconscious, not in any way its whole extent. Indeed, in no field is so much renunciation expected of a man in the course of his development as in his sexuality and scarcely anywhere is this renunciation harder to carry through; in addition, still other wishes left permanently unfulfilled, even though arising from the pure ego instincts, reinforce and interact with this material to form the content of the unconscious. Often we are confronted with the necessity of recognizing an unpleasant reality in which our wishfulfillment finds no place and with the further necessity of making our peace with this stern reality. Now that is a task which the normal person is regularly able to accomplish in his consciousness. But with the appearance of the need to escape an especially painful conflict, the attractive force of that first repression process may work so enticingly that this recent denial finds its solution in the same manner, through repression. With the exception of those cases where the original repression process had not proceeded smoothly, this later repres-

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sion also succeeds. As a result of failure in this repression, the neurosis makes its appearance. But also with healthy individuals, under the favoring coöperation of the sleeping state, the unfulfilled wishes of the present find connection with those of childhood and from this union arises the structure of the dream. Since every person is not only a dreamer but also in some one part, at least, closely related to the neurotic, perhaps in the anxiety-affects which he suffers, perhaps only in the production of the little mistakes of daily life, the assumption is justified that the normal individual also removes by repression a part of his mental conflicts, especially those which invite this fate by their resemblance to the conflicts of childhood.

We turn now to that group of forces which cause the repression. One of these forces, we have already recognized, namely, the demand arising from the organic changes occurring before and during puberty, as a result of which, the psychic primacy of the genitals corresponding to the bodily development and the unification of the component instincts directed toward the activity of these organs, became necessary. The weightiest factor, however, is the demand which the cultural environment imposes on the growing individual, to which he cannot submit himself without giving up his infantile wish-goals. The repression indicates the measure of the sacrifice which the cultural development of a community enjoins on its members. The means by which the cultural demands make themselves evident to the adolescent are manifold. By far the most important is the influence of the objects of the infantile love-choice, the education by the parents or their representatives.

Here must be mentioned some of the instinct-mechanisms by which the successful division between conscious and unconscious is first rendered possible. Where love and hate, both directed toward the same object, are opposed to each other, the weaker one must sink into the unconscious. This ambivalent relation may also be shown with certain instincts which are composed of a pair of component opposites (for example, sadism and masochism). Since the two contrary instincts cannot exist side by side, the stronger assumes the initiative and crowds the weaker into the unconscious.

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In all cases, the effect of the ambivalence is to cause the victorious member, in order to assure its supremacy, to show an unusual intensity in the conscious mental life (reaction formation); to this reaction formation the instinct under subjection also affords a contribution of energy since the possibility of direct expression was taken from it by the repression. Still more important for the purposes of civilization is the ability of many instincts to change their modes of gratification by accepting another aim for winning of pleasure in place of the one previously enjoyed; the two modes of gratification must be similar and between the old and new aims there must be an associative connection. In this way, it is possible to divert at least a portion of the gross sexual instincts of the child to higher cultural aims (sublimation). The portion not divertible, so far as it may not be directly gratified, falls under the repression.

Because certain desires are repressed, it does not follow that a wish which is unconscious and cut off from direct affect-expression, can develop no further activity; on the contrary, the repressed wish exercises a determining influence on the most important processes of the mental life as far as this is possible during the condition of being excluded from consciousness. In this matter, there are two points which need a further elucidation: first, by what mechanisms does the unconscious succeed in becoming active without offending against the condition imposed by the repression? Second, in what psychical products do unconscious processes or those which are directed by the unconscious, have an especially large share?

The mechanisms by which the repressed instinctive impulses and unconscious wishes succeed in breaking through the repression and influencing the actions and thought of the civilized man in his relation to reality serve collectively, as the nature of the conflict with the unconscious demands, for the distortion of the unconscious and its compromise with consciousness. This distortion becomes developed to various degrees according to the stage of repression, the mental status of the individual and the degree of civilization of the race; in short, corresponding to the prevailing relation of consciousness to the unconscious; while this conflict between consciousness and the unconscious is going

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on, it produces various valuable compromise products in social relations. As psychoanalysis learns to consider the ideational life, in general, as counterplay of the instinctive life, so the individual mental mechanisms of distortion and compromise formation correspond to the different possibilities of the fate of instinct; among these possible results, we recognize besides the repression, still others, especially tranformations of instincts (such as the inversion into the opposite). We have now to devote special attention to those processes which, unlike the repression, do not find an end with the banishment into the unconscious, but send substitute structures into consciousness which are derived from the original sources of affect. This fate may befall both the instinct in question and its sublimated representative. For example, we recognize in the mental field the mechanism of biased projection, by means of which an inner, unbearable perception is projected outward; another example is the mechanism of "splitting into parts" (dissociation) which separates into the constituent parts the elements usually united in the unconscious, especially contradictions (of ambivalence, contrary meaning, etc.); this mechanism of splitting makes contrasts in order to render possible the conscious acceptation of the separate impulses which have become unbearable to one another. On the other hand, we have what you might call the introacting mechanisms of the real repression and the condensation (contamination) which seek to save or blend the elements which have become unbearable to consciousness, especially contrasts. Finally, there corresponds to the inversion of instinct, the representation by the opposite, in which a shocking unconscious element is usually represented by its opposite excessively emphasized in consciousness. Other mechanisms exercise a distorting and compromise-forming influence by the inversion of affect, by the displacement of the affect from the important to the non-essential, and lastly by the shifting of sensations or the perception of these from shocking to innocent places (displacement from below upward).

While the mechanisms named, even if acting under the biased, distorting compulsion of the conscious censor, nevertheless, work according to their own laws which are inherent in the uncon-

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scious because of its close relation to the instinctive life, still there are other influences, proceeding from the logical and formal demands of consciousness, which compel still further modifications of the unconscious material. In this group belongs, first of all, the so-called secondary elaboration of the dream, which seeks to adapt to the demands of the fully conscious psychic judgment the unconscious material which is in certain parts too much distorted, in other parts too little distorted, and therefore at first, unintelligible, defective or too shocking. In this over-elaboration and arrangement, isolated elements of the unconscious, which are no longer intelligible, are afterwards given a logical motive in favor of the connection striven after; in the course of development, these elements often, indeed usually, receive a new, as one might say, systematized sense. This kind of secondary elaboration, namely, the mechanism of rationalization or systematization proceeding from consciousness, which is of far reaching importance for the origin of the psychoanalytic understanding, especially of the great achievements of civilization, represents an appropriate supplement to the mechanisms of the unconscious by arranging and elaborating the biased, distorted unconscious contributions of the phantasy and mental activity to new, useful connections. The knowledge of this process (rationalization) and the possibility of its reduction to the impelling forces of the unconscious, permit psychoanalysis to hold fast to the principle of over-determination of all psychic phenomena, so far as the unconscious shares in them, even where a logical, satisfactory meaning and a fully conscious understanding seems to render any further explanation of a phenomenon superfluous and excluded. So little, however, as the knowledge of the conscious part in itself alone, affords the full understanding of a mental performance, even so little may the consideration of the unconscious motives by themselves alone exhaust the full significance; still, the unconscious motives alone render intelligible the genesis of the mental production and also the process of rationalization itself in its relation to the denial of the repressed material.

A further, formal factor, to which the unconscious must conform in its sometime entrance into consciousness, is the attempt at dramatic form which appears in the culturally valuable per-

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formances, especially the artistic ones, not less plainly than in the dream life. It is conceivable without further discussion, that the material in which an unconscious impulse manifests itself, must not only influence the definite form but also the content in a certain sense, that thus, for example, the poet must bring the same feeling to expression differently from the painter; the philosopher, the same thoughts differently from the writer of myths. And further, the temporary state of mind will make itself evident in the representation so that the inspired religious writer will afford different expression to the same emotions than the matter-of-fact expositor; and the lunatic represent the same impulse differently from the dreamer.

A final means of expression of the repressed material, which, on account of its especial suitability for disguising the unconscious material and its adaptability (compromise formation) to new contents of consciousness, finds great favor, is the symbol. We understand under this term, a special kind of indirect representation which is distinguished by certain peculiarities from the closely related figures of speech, such as simile, metaphor, allegory, allusion and other forms of pictorial representation of thought material (after the manner of the rebus). In a measure, the symbol represents an ideal union of all these means of expression: it is a representative pictorial substitute expression for something hidden, with which it has perceptible characteristics in common or is associatively joined by internal connections. Its essence consists in the possession of two or more meanings, as it has itself also arisen by a kind of condensation, an amalgamation of individual characteristic elements. The tendency of the symbol from the ideal toward the evident puts it close to primitive thought; by this relationship, symbolization belongs essentially to the unconscious but, as compromise formation, lacks in no way the conscious determinants which condition in various degrees symbol formation and symbol interpretation.

If one wishes to understand the many-layered strata and arrangement of symbol interpretations and gain a knowledge of symbols, he must apply himself to a genetic consideration of the same. He will thereby learn that the symbol formation is not, as its multiplicity would lead one to expect, arbitrary and de-

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pendent on individual differences, but that it follows definite laws and leads to widely distributed, universal, human structures which are typical as regards time, place, sex and race distinctions, and indeed the great languages. Concerning the typical, general human significance, the esthetician Dilthey says: "If one understands under a natural symbol, the pictorial material which stands in close and constant relation to an inner state, then the comparative consideration shows, that on the basis of our psychological nature, a circle of natural symbols exists for dream and delusion, as for speech and poetry. Since the most important relations of reality, in general, are related and the heart of man in general the same, fundamental myths pervade humanity. Such symbols are: the relation of the father to his children, the relation of the sexes, war, robbery and victory."

The investigation of typical symbol forms and the restoration of the forgotten meanings of these by the collaboration of various assisting sciences (as history of civilization, linguistics, ethnography, investigation of myths, etc.) has scarcely been attempted as yet. The best studied psychoanalytically and also the first to be verified by the history of civilization is that great and highly important group of symbols which serve to represent sexual material and erotic relations, the sexual symbols as we are accustomed to call them. The prevalence of sexual symbolic meanings is, however, not explained merely by the individual experience that no instinct is subjected to the cultural suppression to the same extent and so withdrawn from direct gratification as the sexual instinct built up from the most diverse "perverse" components, the mental domain of which, the erotic, is therefore susceptible of, and in need of, extensive indirect representation. A far greater importance for the genesis of symbolism is afforded by the fact that to the sexual organs and functions, in primitive civilizations, an importance which is quite inconceivable to our minds, was attributed; of this difference, we can gain a closer idea from the results of ethnographic investigation and the remains saved in cult and myth.[1] To this sexual exaggeration of primi-

[1] Compare R. Payne Knight, Le culte du Priape, Brussels, 1883, and Dulaure, Die Zeugung in Glauben, Sitten und Bräuchen der Völker, German translation and amplification by Krauss, Reiskel und Ihm.

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tive man and to the limitation which at some time became necessary, we owe the foundations of civilization, just as we are indebted for its further improvement to the continued sublimation of individual component instincts which have been ungratified and become repressed. As an example, when we to-day find ploughing and creation of fire applied by a dreamer as a completely unconscious symbol of the sexual act, the study of the history of civilization teaches that these performances have originally really represented the sexual act, that is, were invested with the same libidinous energies, eventually also with the same accompanying ideas as these. A classical example of this is afforded by the fire creation in India, which is there represented under the picture of coition. In the Rig Veda (III, 29, 1), we read:

"This is the fire-drill; the generator (the male rubbing stick) is prepared! Bring the generatrix (the female rubbing stick); we will twirl the fire after the old style. In the two rubbing sticks dwells the judge of nature (Agni) like the fruit of love which has been introduced into the pregnant women. . . . In her who has spread out her legs enters as a herald (the male stick)." (After L. v. Schröder's translation in "Mysterium und Mimus im Rig Veda," page 260). When the Indian lights a fire, he offers a holy prayer which refers to a myth. He seizes a stick of wood with the words:[2] "You are the birthplace of fire," lays thereon two blades of grass. "You are the two testicles," thereupon, he seizes the wood lying underneath: "You are Urvaci." He then smears the wood with butter, saying, "You are strength," places it then on the wood lying on the ground and says: "You are Pururavas," etc. Thus, he considers the wood lying on the ground with its little hollow as the representation of the conceiving goddess and the upright stick as the sexual member of the impregnating god. Concerning the diffusion of this idea, the well known ethnologist, Leo Frobenius, says: "The fire-drilling as it is to be found among most peoples represents thus among the ancient Indians the sexual act. I may be permitted to point out in this connection that the ancient Indians were not alone in this

[2] According to Schröder, the oldest ritual texts, the Jajurweden, already introduce this formula.

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conception. The South Africans have exactly the same view. The wood lying on the ground is called by them 'female shame,' the upright piece, 'the male.'[3] Schinz has explained this in his time for some races and since then the wide diffusion of this view in South Africa, and for example among the races living in the East, has been found." (Das Zeitalter des Sonnengottes, Berlin, 1904, page 338 ff.)

Between the two extreme stages, that of actual identification (in custom) and that of unconscious application in symbol (in dream), lie other, more or less conscious, symbolic meanings, which, in the degree in which they have become unrecognizable, have been precipitated in speech. Further plain reference to the sexual symbolic significance of fire-lighting, we find in the myth of the stealing of fire by Prometheus, the sexual symbolic foundation of which, the mythologist, Kuhn (1859) has recognized. Like the Prometheus saga, other traditions also bring into connection the creation by the heavenly fire, the lightning. Thus, O. Gruppe[4] says concerning the saga of Semele, out of whose burning body, Dionysos was born, it is "probably a very scanty remnant of the old legendary type which had reference to the kindling of the sacrificial fire" and its name "perhaps originally meant the tablet or table, the under rubbing stick (compare Hesych, σεμελη τράπεζαι . . .). In the soft wood of the latter, the spark ignited, in the birth of which the 'mother' is burnt up." Further, in the mythically adorned story of the birth of Alexander the Great, we read that his mother Olympia, in the night before her wedding, dreamed that a mighty thunderstorm enveloped her and the lightning penetrated her womb in a flame, from which, a furious fire burst out and disappeared in farther and farther consuming flames[5] (Droysen, History of Alexander the Great, page 69). Here belong further the famous fable of the magician, Virgil, who took vengeance on a prudish beauty by extinguishing

[3] In Hebrew, the expressions for male and female signify: the borer and the hollowed.

[4] Griech. Mythol. u. Relig. Gesch., Vol. II (Munich, 1906), p. 1415 ff.

[5] Similarly, Hecuba, pregnant with Paris, dreamed that she brought a burning brand into the world which set the whole city on fire. (Compare in this connection the burning of the Temple of Ephesus in the night of the birth of Alexander.)

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all the fire of the city and allowing the citizens to light their new fire only on the genitals of the woman exposed naked to view; opposed to this commandment for fire-lighting, stand other traditions in the sense of the Prometheus saga as prohibitions of the same, as the legend of Amor and Psyche, which forbids the inquisitive wife scaring away the nocturnal lover by striking a light or the tale of Periander whom his mother visited by night under the same conditions as unrecognized beloved. Our present-day speech has also preserved much of this symbolism: we speak of the "light of life," of "glowing with love," of "being infatuated" in the sense of being in love and call the beloved, "flame."

Corresponding to the lower rubbing stick then, every fireplace, altar, hearth, oven, lamp, etc., is a female symbol. Thus, for example, in the Satan's mass, the genitals of an undressed recumbent woman serve as an altar. To the Greek Periander, was sent according to Herodotus (V, 92) by his dead wife Melissa, a divination with the averment, he has put the bread in a cold oven, which was a sure omen to him "since he slept upon the corpse of Melissa." The bread is here compared to the phallus; according to the interesting works of Höfler, namely, that concerning bread images ("Gebildbrote"), our present-day rolls and pretzels imitate the phallus (compare Zentralblatt für Anthropologie, etc., 1905, p. 78). But the substance produced in the bake-oven, the bread, is also compared with that created in the mother's body, the child, as the name, body ("Leib") (only later differentiated into "Laib"), and the form with the navel in the middle, allow to be recognized. On the other hand, one still describes birth in the Tyrol by the expression: "the oven has fallen in," as also Franz Moor in Schiller's "Rauber" sees the only brotherly relation to Karl in the fact that "they were both out of the same oven." But the sexual meaning extends to everything which comes into contact with the original symbol. The eating, by which the stork lets the child fall, becomes the female symbol, the chimney-sweeper the phallic symbol, as one may still recognize in its present significance of good luck; for most of our good luck symbols were originally symbols of fruitfulness, as the horseshoe, the clover leaf, the mandrake and others, and

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here, again, the sexual life seems closely united to vegetation and agriculture.

For the original sexual meaning of ploughing, outside of the phallic significance of almost all kinds of implements,[6] the conception of the earth as the "old mother" (Urmutter) was the determining factor (compare the splendid book of von Dieterich, Mutter Erde (Mother Earth), 2d edition, 1913). To antiquity, this idea was so common that even dreams, as for example, that reported of Julius Caesar and Hippias, of sexual intercourse with the mother, were interpreted to mean the mother earth and taking possession of it. Also in Sophocles' Oedipus the hero speaks repeatedly of the "mother field from which he had sprouted." And even Shakespeare in Pericles has Boult, who would deflorate the refractory Marina, use a symbol from the fields (IV, 5): "And if she were a thornier piece of ground than she is, she shall be ploughed." Too well known to be mentioned here, are the names for the male creative processes derived from the domain of agriculture (semen, fructification, etc.). The identification of human and vegetative fructification underlying these speech relations is easily to be recognized in the fructifying magic retained until very recent times, which consists in a naked couple performing the sexual act in the field, as it were to arouse the ground to imitation. Noteworthy in this connection is the fact that both in Greek and Latin as well as in Oriental languages, "ploughing" is commonly used in the sense of practicing coitus (Kleinpaul, Rätsel d. Sprache, p. 136) and that according to Winckelmann (Alte Denkmäler der Kunst) the expressions "garden," "meadow," "field" in the Greek denoted the female

[6] Knife, hammer, nail, etc. Thor's hammer, with which, especially, the marriage was consecrated, is recognized by Cox (Myth. of the Aryan Nations, 1870, Vol. II, p. 115), Meyer (Germ. Myth., 1891, p. 212) and others in its phallic significance and the corresponding thunderbolt of Indra is his phallus (Schlesinger, Gesch. d. Symbols, 1912, p. 438). Concerning the nail, Hugo Winckler says: "The nail is the tool of fruitfulness, the penis; hence its figure in the old Babylonian cones is still to be recognized, which represent the driven clavus of the Romans; compare Arabic na'al = copulate ('Arabic, Semitic, Oriental')." Mitt. d. Vorderasiast. Ges., 1901, 4/5. Still in present-day folk life of Bavaria, Suabia, Switzerland, the iron nail plays a rôle as symbol of the phallus and fruitfulness (Arch. f. Kriminalanthrop., Vol. 20, p. 122).

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genital organ in jokes, which in Solomon's Song is called vineyard. The neurotic counterpart to this symbolizing personification of the earth is found among the North American Indians whose resistance against cultivation by ploughing is explained by Ehrenreich that they are afraid to injure the skin of the earth-mother; here, the identification has succeeded too well, as one might say.

Other symbols of apparently individual significance allow their typical form and application to be deciphered from the connections with the history of development, as, for example, the symbolization of the father as emperor or one of the persons of high authority. Here too, the history of civilization shows the original real significance of the relation which later continues only in the symbol, namely, that the father in the primitive relations of his "family" was actually invested with the highest degree of power and could dispose of the bodies and lives of his "subjects." Concerning the derivation of kingdom from the patriarchy in the family, the philologist Max Müller expresses himself as follows: "When the family began to develop into the state, then the king in the midst of his people became what the father and husband had been in the house: the master, the strong protector.[7] Among the manifold terms for king and queen, in the Sanscrit, there is simply father and mother. Ganaka in Sanscrit means father, from GAN, to beget; it also appears in the Veda as the name of a well-known king. This is the old German chuning, English king. Mother in Sanscrit is gani or ganî, the Greek γυνή, Gothic quinô, Slavic zena, English queen. Thus queen (Königin) originally signifies mother or mistress and we see repeatedly how the speech of the family life gradually grew to the political speech of the oldest Aryan state." Even at the present, this conception of the kingly ruler and of divine and spiritual superiority is still alive as "father" in the speech usage. Smaller states, in which the relations of the prince to his subjects are still closer, call their ruler, "Landfather" (Landes-

[7] Father (Vater) is derived from a root PA which means, not beget, but protect, maintain, nourish. The father, as procreator, is called in Sanscrit, ganitor (genitor). Max Müller, Essays, Vol. II, Leipsic, 1869, German edition, p. 20.

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vater); for the people of the mighty Russian empire, their czar is the "Little Father" as in his time was Attila for the powerful Huns (diminutive of Gothic, atta = father). The supreme ruling head of the Catholic Church is called by the believers, as representative on earth of God, the Father, "Holy Father" which forms in Latin the name "papa" (pope), a term by which our children still denote the father.

These few examples may suffice to characterize the great age, the rich content, the extensive and typical field of application, the cultural historical as well as individual importance of symbolism and to show the continuance of the symbol-forming forces in the mental life of present-day civilized people.

Psychologically considered, the symbol formation remains a regressive phenomenon, a reversion to a certain stage of pictorial thinking which exists among highly cultured people in clearest shape in those exceptional states, in which the conscious adaptation to reality, is either partially limited, as in the religious and artistic ecstasy, or seems totally annulled, as in the dream and mental disturbances. Corresponding to this psychological conception, is the original function of identification underlying symbolization; this identification is demonstrable in the history of civilization as a means of adaptation to reality which becomes superfluous and sinks to the mere significance of a symbol as soon as this task of adaptation has been accomplished. Thus, symbolism seems to be the unconscious precipitate of primitive means of adaptation to reality which has become superfluous and unsuitable, a sort of lumber-room of culture to which the adult person in conditions of reduced or deficient capability of adapting to reality, gladly flees, in order to regain his old, long-forgotten playthings of childhood. That which later generations know and consider only as symbol had in an earlier stage of mental development complete real meaning and value. In the course of development, the original significance fades more and more, or even changes, so that speech, folklore, wit, etc., have often preserved remnants of the original connection in more or less clear consciousness.

By far the most comprehensive and important group of primitive symbols, which seem quite far-fetched to conscious thought,

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is composed of those which originally sexualized phenomena and processes of the external world in the service of adaptation, in order in later stages, to apply these anthropomorphisms, which were again separated from this original meaning, as "symbols" of sexual affairs. Besides these symbols, there seem to be still other forms and mechanisms of symbol formation which, inverted, symbolize the human body, its organic processes and mental states by harmless or apparently easily representable things of the external world. To this group, belongs the category of somatic symbols, best known from the dream investigations of Scherner; these somatic symbols represent parts of the body or the functions of these in pictorial fashion (for example, sets of teeth as rows of houses, pressure of urine as a flood, etc.); another similar category is that of the so-called (H. Silberer) functional symbols which represent plastically, conditions and processes of the individual mental life perceived endopsychically (the constant functioning of the mind), such as the sad mood, by the picture of a dismal landscape, the following of difficult trains of thought, by the difficult mounting on a horse which is all the time getting farther away, and others. Both these kinds of "introjecting" symbol formation, which are apparently contrasted to the first described "projecting" variety of the material category which symbolizes the psychic content, might perhaps better be considered, not as special kinds of symbol formation, but rather as kinds of pictorial representation of physical and mental processes occurring regularly, to a certain extent, in the real symbol formation. Thus, for example, in the phallic symbol of the serpent, besides the form, the ability to rise up, the smoothness and suppleness of the phallus, especially its dangerousness and uncanniness are represented, that is, not essential components of the same, but definite mental relationships thereto (anxiety, abhorrence), from which relationships, others actually lead to other symbolizations of the male member (for example, as bird, etc.), while in many symbols, certain somatic attributes and conditions find representations (cane = erection, syringe = ejaculation, empty balloon envelope = flaccidity).

To sum up, we may specify the following characteristics for the real symbol in the psychoanalytic sense, as we recognize it

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best in the speech of the dream and also in a series of other mental productions:

Representation for the unconscious, constant meaning, independence of individual conditions, evolutionary foundations, speech relationships, phylogenetic parallels (in myths, cult, religion, etc.). The occurrence of these conditions under which we speak of a symbol and of which, now some, now others are demonstrable beyond dispute, affords us at the same time the possibility of verifying the symbolic meanings recognized in the mental life of the individual and of attaining most valuable certainty in this vague and obscure field. Further corroboration for the symbol investigation is afforded by the rich material in folklore and wit, which often enough may apply to other fields only unconsciously; especially do folklore and wit use sexual symbols so that they must be familiar to everyone.[8] Our knowledge of the symbol receives a further very noteworthy confirmation and partial enrichment from the psychoanalytic study of certain insane patients, among whom, one type, the so-called schizo- or paraphrenic has the peculiarity of disclosing to us openly the secret symbolic meanings. Finally, we have recently gained an experimental method which affords the verification of known symbols and the discovery of new individual ones in a manner free from all objections, thus destroying every doubt of the existence of a sexual dream-symbolism.[9] Likewise, what

[8] Certain forms of wit, closely related to the obscene riddles, were in their preponderating number, according to Schultz (Rätsel aus dem hellenischen Kulturkreise, 1912, II part), "originally no riddles, but symbolic, in part, indeed dialogical descriptions of ritualistic processes of the creation of fire, gaining of intoxication," which in union with sexual creation "stood in the central point of the old Aryan ritual." "If they were sung along with the action in question, no hearer could be in doubt of the meaning of such a verse." "Only later, when, with the religious practice, this understanding faded, did they become riddles and had to be adapted to various traditional solutions" (page 117 ff.).

[9] The subject of the experiment is given the hypnotic command to dream something definite, some sexual situation. She dreams this but not in direct representation as is the case with harmless commands, but in symbolical guise, which corresponds completely with that disclosed by psychoanalysis in the ordinary dream life. Compare Dr. Karl Scrötter: Experimentelle Träume (Experimental dreams), Zentralblatt für Psychoanalyse, II, 1912.

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may be considered as such an experiment arranged by nature, is afforded by certain dreams in which a bodily need of sexual or other nature attempts to gratify itself in definite typical symbols, before the irritation leads to awakening and therewith to the appreciation of the symbolic meanings (waking-dream). One principle of the symbol investigation which is not to be underestimated is the result which allows us to gain a good meaning and deep significance for unintelligible expressions of the mental life. This kind of scientific proof in the field of symbol interpretation, we share completely with the conception of the investigator of speech and myth, Wilhelm Müller, which he has represented against his colleagues for more than a half century: "As we ascertain the meaning of unknown words by assigning them a place, at first according to the context, and consider these meanings correct if they are suitable in all places where the word recurs, so it is with the explanation of a symbol, aside from other standpoints, to consider it correct, if it permits of the same explanation everywhere it occurs, or in a great number of cases, and agrees with the connection of the myth."

The knowledge of the real unconscious meaning and its comprehension, is neither alike with all symbols nor does it remain constant during the course of development and change of significance of the same symbol. Further, the comprehension of the symbol is different within a circle of culture holding about the same content of consciousness, according to the fields of application, the stratum of population in which it appears and the mental condition of the person using it. It shows that the conditions for the comprehension of the symbol stand in a contrasting correlation to the tendencies of the symbol formation. While the symbolic representation appears in the service of the unconscious desires, in order to smuggle the shocking material in disguised form into consciousness, a certain indefiniteness must adhere to the symbol which can shade from easily transparent ambiguity (in obscene joke and wit) to complete incomprehensibility (in dream and neurosis). Between these two possible extreme attitudes of consciousness to the symbol and its comprehension, lies a series of what might be called complete symbolizations, such as are shown in religion, myth and art; these symbolizations on the

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one hand render possible an intelligible representation and conception but on the other hand are not without a deep unconscious meaning.

At this point we come to the second of the questions propounded above, namely, in what psychic products, unconscious processes or those processes derived from the unconcious, assert themselves most plainly by means of the mechanisms described.

We have already mentioned some formations which signify a disturbance of normal mental activity and could not deny their close relationship to the unconscious. It is just these cases, where the unsatisfying outcome of the conflict between unconcious and repression, supported by other circumstances, causes illness; such maladies, resulting from unsuccessful repression or that repression which has again become regressive, we number among the psychoses, if they permanently destroy the normal relation to reality; we call them psychoneuroses, if in spite of the partial regression to the infantile attitude, the essential traits of cultural personality have remained intact. A related case is that of hypnosis and suggestion, of which normal and healthy individuals are also susceptible. A temporary loss of the function of reality appears in sleep, during which a mental activity comes before consciousness as the dream which is dominated chiefly by the unconscious. Finally, there belong in this category, the errors of execution, such as errors of speech and writing, forgetting of names, mistakes and the like, which point plainly to the working of a psychic force opposed to the conscious attitude.

All these phenomena have the common characteristic that they seek to sever and weaken the relations to the fellow men. The isolating characteristic of the neuroses and psychoses and the tendency of these to take men from vocation and family is generally recognized. In hypnosis, the hypnotized person is subjected to the influence of one particular person so that he seems cut off from all others. In sleep, this separation is carried out in the most complete manner imaginable, without the exception of even one person. The faulty performances of forgetting and the like, usually have the effect of influencing the ability of communication, even if in an insignificant manner; others, as for example, mistakes (of action) often lead to injury of the surroundings.

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It would be conceivable that the unconscious, which does indeed arise essentially in the presocial time of humanity, might express itself also preëminently in a social or antisocial phenomenon like those thus far enumerated. As a matter of fact, however, the unconscious is of such importance in the mental life that an important cultural progress against its resistance could have scarcely succeeded. It was necessary, on the contrary, to win the extraordinarily intense instinctive forces from this source for the social and cultural work, since without the immense energy afforded by them, no result would have been attainable.

The useful activities favoring the prolongation of life and elevation of the standard of living were mostly uncomfortable and tiresome. If things could be so arranged that the repressed wishes would find a gratification, even if only a symbolic one, then these important acts would become pleasant and in this way, a real stimulus would be provided for their execution. For such a gaining of pleasure in symbolic activity, the sexual wishes were best suited, since with them, the aim can be displaced from reality to the hallucinatory gratification of phantasy easier than with the ego instincts, where the real gratification is necessary for the existence of the individual and which, as for example hunger, can endure no other form of gratification.

We have seen that the unconscious is that part of the mental life which, bent upon immediate gain of pleasure, will not submit to adaptation to reality. So far, then, as the human mental activity had to deal exclusively with reality and its domination, nothing could be started with the unconscious. But in all those fields where a diversion from reality was allowed the mind, where phantasy might stir its wings, its field of application was assured. Hence, if we find in older stages of culture, activities, which for us have nothing to do with phantasy, as agriculture or administration of justice, carried out with symbolic phantastic acts, this is explained by the fact that amid primitive relations the demands of the unconscious were far more strongly accentuated than with us.

Other products of culture, in which the world of phantasy played an important rôle, have been able to preserve their characteristics pure, or to yield them to the developing function of

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reality; in this group belong religion and art with all their forerunners and offshoots.

Thus, we see before us a double series: on one side, the asocial, the forms of expression of the unconscious limited and accounted to the individual, especially the dream and the neurosis, which will not further engage our attention here; on the other side, the phenomena most important for the origin and development of civilized life, myth and religion, art and philosophy, ethics and law. The psychological share which must have been necessary for the mental sciences devoted to these structures can therefore never be elucidated with entire satisfaction if the psychology of the unconscious is not included.

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CHAPTER II

Investigation of Myths and Legends

The justification for utilizing the methods and results of psychoanalysis for the comprehension of the origin, variation and significance of mythical traditions is founded on the fact that in that kind of investigations, the boundaries of the true psychoanalytic domain are not in the least overstepped. Aside from the fact that the myth has always been considered as needing interpretation, it is scarcely to be denied that in the mythical and legendary tales of primitive and cultured peoples, independently of whatever meaning and content these may have, we are dealing with the products of pure phantasy; this conception affords us surety for the justified and necessary share of psychological consideration in the investigation of myths. It is in the illumination of the human phantasy life and its productions that psychoanalysis has accomplished its greatest achievement: namely, the discovery of the powerful unconscious instinctive forces which impel to phantasy formation, the elucidation of the mental mechanisms which have shared in the origin of this phantasy life and in the comprehension of the predominant symbolic forms of expression which came to be employed.

The first incitement to psychoanalytic labors in attempting to understand myth formation and myth significance proceeded from the insight into the origin and meaning of dreams, for which we are indebted to Freud. Of course, psychoanalysis was not the first to call attention to the relations between dream and myth; the extraordinary importance of dream life for poetry and myth has been recognized at all times, as P. Ehrenreich[10] points out. Not only may dreams have been the only source of myth formation among many peoples according to their own statements, but

[10] Die allgemeine Mythologie und ihre ethnologischen Grundlagen (General Mythology and its Ethnological Foundations), Leipzic, 1910, page 149 (Mythol. Bibl., IV, 1).

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further, well-known mythologists like Laistner, Mannhardt, Roscher and recently also Wundt, have deeply appreciated the significance of the dream life, especially of the anxiety dream, for the understanding of individual groups of myths, or at least groups of motives. If this point of view has, in recent times, been brought to some discredit by the "interpretation of nature" which has crowded to the foreground, still it nevertheless remains in the eyes of keen observers, as for example, Ehrenreich, undisputed as valuable knowledge. One understands, however, the brusque opposition of the purely internal psychological method of consideration which proceeds from the dream life and the conception which takes as a basis merely the real universe (processes of nature), when one measures the narrow scope of application of a method of explanation which remains so much restricted to the type of the anxiety dream and hence clings to the incomprehensible dream event and dream content.

Though the parallel consideration of dream and myth and therewith the psychological method of consideration was formerly recognized in its principal justification, still there was necessary to a deeper understanding of the dream life, a corresponding progress in the field of myth investigation. The first and at the same time, from many points of view, the most important step in this direction, we recognize in Freud's interpretation of the ancient Œdipus myth, which he was able to explain on the basis of typical dreams of male individuals of the death of the father and sexual intercourse with the mother, as a general human expression of these primitive wish impulses which had actually existed in past ages but have since been intensively repressed. The importance of this discovery deserves to be examined more closely and to be protected from misunderstanding; an explanation of it may introduce us quite a ways into the methods of psychoanalytic myth interpretation.

As is seen, this progress leads far beyond the previous purely external parallelization to the common unconscious sources by which, not only the dream productions, in the same manner as the myth formations, were nourished, but all phantasy products in general as well. Psychoanalysis has thus, not only a definite interpretation to propose, but at the same time establishes the

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necessity of myth interpretation in general, by means of the share which the unconscious has in myth formation. Further, it offers in place of the superficial comparison, a genetic method of consideration which allows myths to be conceived of as the distorted remnants of wish phantasies of whole nations, as you might say, the secular dreams of young humanity. As the dream in an individualistic sense, so the myth in a phylogenetic sense, represents a piece of the past mental life of childhood; it is the most brilliant confirmation of the psychoanalytic method of consideration that it finds the experience of unconscious mental life gained from individual psychology again in the mythical traditions of past ages identical in content. In particular, the portentous conflict of the child's mental life, the ambivalent attitude toward the parents and toward the family with all its many sided relations (sexual curiosity, etc.), has been shown to be the chief motive of myth formation and the essential content of mythical traditions. Indeed, it may be shown that the development of mythical ideas, in their widest extent, reflects just the cultural relations of the individual in the family and the latter in the tribal relationships.

It is an especially good recommendation for the Freudian interpretation of the Œdipus saga that it interpolates nothing in the material and needs for its comprehension no auxiliary assumption, but points out the meaning of the myth directly in the elements given. The only presupposition is the bit of unfrightened investigating spirit—as it is represented in Œdipus himself[11]—which places the psychoanalyst, schooled in the insight into the dream life, in a position to believe in the mental reality of the matter related. We have therewith formulated the most important fundamental concept of the psychoanalytic myth conception,[12] at the same time bearing in mind that the undisguised

[11] One may compare the place in Schopenhauer's writings on Goethe (of Nov. 11, 1815): "The courage to take no question to heart is what makes the philosopher. The latter must resemble the Œdipus of Sophocles, who, seeking explanation concerning his own horrible fate, seeks further without hesitation, even when he already perceives from the answers that the most terrible thing for him will result. But, then, most of us have within us the Jocasta who begs Œdipus, for the sake of all the gods, not to seek further: and we yield to her." (Ferenczi, Imago, I, p. 276 ff.)

[12] This is also a fundamental concept of the psychoanalytic method of consideration in general.

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naïveté of the Greek fable of Œdipus, which admits of its application without commentary, represents only an exceptional case of especial clearness; otherwise, the dream pictures drawn on for the comprehension of the Œdipus fable differ, in their transparency, from the regular type of dream structure strikingly enough. It is not necessary here to repeat the reason given by Freud for this; for us, it is certain that the majority of myths, as well as the majority of our nocturnal dreams, disclose their deeper meaning only after a more or less complicated work of interpretation.

Further, this viewpoint, like the parallelization with the dream, has been in no way appreciated exclusively by psychoanalysis. The view that myths in addition to their manifest meaning—which is not always comprehensible without further study—must have another secret meaning, that only thus are they to be explained, is of great antiquity; perhaps as old as the myths themselves, which, even when they appeared, just like dreams, may have aroused a strange incomprehension, so that it was concluded to attribute objective reality to the tale in order to believe it. It is now, according to various psychoanalytic results, very probable even if not unconditionally demonstrable, that the process, which in an early stage of rich development, is called myth formation and which later separates into cultistic, religious, artistic, philosophic endeavors, took its beginning at a period when man no longer dared confess openly his naïve faith in the psychic reality of his wishes and appetites, thus, at a time which we recognize in the development of the individual as the beginning of the repression.

With this insight, a second important principle of psychoanalytic investigation of myths is given. If the myth is, as we know from the dream and other mental performances, a product of powerful mental tendencies clamoring for expression and at the same time also of the counter impulses which keep these from complete achievement, then the activity of these tendencies must find expression in its content and a psychological interpretation will have to find its task in the elucidation of these distortions. Of course, in doing this, the aim and object of the investigation must always be kept in mind: by the exhibition of the unconscious

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instinctive forces which participated in the myth formation to establish the secret psychological meaning of the myth; in doing this neither the oldest form of the mythical tale nor the original conscious significance of the same is in any way reconstructed, the restoration of this being the special task of mythology. Although it is not to be denied that in many cases the more original tradition stands closer to the unconscious meaning, since, with the progress of the repression, farther reaching distortions are always joined, still the principle of the gradual return of the original repressed material should not be forgotten; this principle permits us to discover, often in even highly complicated and late formations, as for example in legends, less disguised bits of the unconscious meaning. That far also, psychoanalysis will not be able to escape the comparative investigation of myths and legends; of course not to the extent of making the ultimate aim, the constructing of the original formation of the myth, rather with a view of inferring the unconscious meaning which probably will not have been fully apparent even in the earliest form. For the need for the construction and repetition of myths can have originated only with the renunciation of certain real sources of pleasure and the necessity for a compensatory substitute for this renunciation in gratification by phantasy. This real renunciation seems to be the phylogenetic counterpart of our psychic repression and compels the wish-phantasy to resemble distortions like those of the repression, even if not such refined ones. Naturally, there exists also in the psychological reduction of the distorted mythical tradition to its unconscious instinctive forces, the first mentioned fundamental principle of law, for there is demanded here, the same recognition of the inferred interpretation as a psychic reality as that which, in the forms closely related to the Œdipus saga, had to sanction merely the manifest content as the real meaning. Thus, psychoanalysis reconstructs the wish-fulfillment which was formerly consciously tolerated, then forbidden and allowed in consciousness only again distorted in the form of the myth, the giving up of which pleasure affords the impulse to myth formation. From this viewpoint, it is clear that in the ultimate end there is nothing else to prosecute except psychology, analysis of phantasy life which manifests itself just

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as well in other forms. But the relation of mental content and processes to the phenomena of nature which is peculiar to the myth, perhaps characteristic of it, belongs in part to the pre-mythical period of "animistic view of the world," the consideration of which phenomena leads us back again to a psychological starting point for myth formation and myth investigation. If the mythology of the present-day may consider its task the tracing back of the mythical tales handed down in purely human dress (and the "myth" is nothing else than a "narrative") to the representation of processes of nature, as for instance it has "interpreted" the splendid sensual Song of Solomon as conversation between Christ and the Church, the task of the psychologists will remain just the reverse: to derive and comprehend from their psychological sources the phantasy products clothed in human dress even where they seem to transfer directly to other processes. This comes about by means of the knowledge of the processes of repression and substitute formation and the mental mechanisms thereby involved as they have become known to us from the psychoanalytic study of human phantasy life.

If one decides, in the manner indicated, to consider these dynamic factors as essential for the formation of myths, then one understands not only the early appearing need for an interpretation of the distorted and incomprehensible mythical product, but also the way by which one must seek this. If the myth is constituted as compensation for disowned psychic realities and the justifiable projection of these upon superhuman gods and heroes to whom may still be permitted that which has become shocking to man, then the need of interpretation which rather belongs to the myth, will necessarily seek to substantiate and strengthen this defence. Thus, the interpretation will not apply itself to the underlying mental realities, but, on the contrary, to the phenomena of the external world which admit of a relation to the phantasy product which is only partially understood and refused by consciousness. That especially wonderful heroes and extraordinary men are suited to take upon themselves, in a certain measure collectively, the impulses succumbing to the general repression and to carry them through as superhuman and heroic deeds, is indeed plain and will be sufficiently proven by the

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bearers of the mythical tales as well as by the deeds ascribed to them. Less evident seems the relation of humanly conceived myths and legends to the processes of nature and the heavenly bodies as the nature-mythological method of interpretation presents them. Still, for the present, one needs only to retain as psychological justification for this conception that the phantasy-gifted man of ancient times also attributed to the inanimate phenomena of nature, amid which he stood with wondering incomprehension, according as they were suitable, certain of his own affects and thus wove them into his own mental life. The process of nature, in itself, of course did not furnish him with a motive but only provided him with material for the phantasy formation, just as the dreamer often cleverly weaves into his dream picture external irritations. One may perhaps estimate the importance of the phenomena of nature for myth formation as psychoanalysis does the actual material from daily life for the dream picture resulting from unconscious motives. It is probable, that for the myth-creating man, the projection of the denied gratification upon deified heroes and humanized gods did not suffice but that he further, in anthropomorphical manner, drew into the myth formation the natural processes as representing the will of the gods. The circumstance that the finished myth permits this share to be recognized up to a certain degree of varying clearness seems to speak for the fact that even at the time when the myths were forming, the humanized conception of the processes of nature was co-determining. Apparently in the manner that the phenomena had already at an earlier period been personified in the service of self-preservation (fear) and by way of self-representation (projection of the ego upon the external world), at the time when man sought after external objects of representation for his repressed impulses, these were utilized as material for myth formation, while the instinctive force for both processes arose from the unconscious affect life. With this view corresponds the fact that the nature-mythological interpretation which is not to be disputed in its justification—namely, for the fixed mythical calendar dates—is always able to show in a purely descriptive way what processes of nature may correspond to definite mythical motives, but not to lead to the dynamic under-

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standing of the mental processes which guide to the anthropomorphic apperception of external processes in general and further to the organization of these in the form of human narratives. When, in opposition to this view, the extreme representatives of the nature interpretation method hold firmly in unchangeable persistency to the belief that with the pointing out of atmospheric, lunar, astral and similar elements in the myth, which now and then can be read out of it only by means of artificial and allegorical juggling, the interpretation has been fully given, then there awakens beyond these statements a new interest for the psychologist. He gains the impression that the investigators who devote themselves to an exclusively nature-mythological method of interpretation—no matter in what sense—in their attempts to establish the meaning of the mythical tales, may find themselves in a position similar to that of the primitive creators of the myths in that they strive to disguise certain shocking motives by relation to nature, by projection of the offensiveness of these upon the external world and thus to deny the mental reality underlying the myth formation by the construction of an objective reality. This defence tendency has probably been one of the chief motives for the mythical projection of shocking thoughts upon cosmic processes and its possibility for reaction formation in the service of explanation of myths is naïvely considered by the founders of the nature-mythological method of interpretation as an especial advantage of their method. Thus, Max Müller[18] avows that "by this method, not merely do meaningless saga attain a real significance and beauty but that one may thereby eliminate some of the most revolting traits of classical mythology and ascertain their true meaning." Against this naïve confession, one is glad to recall the sharp words of Arnobius, who, as an adherent of early Christianity, had a personal interest in making out the heathen gods as coarse as possible and who therefore rejected the allegorical myth interpretations of his contemporaries (about 300 A. D.) with the following words: "How far are you sure that you perceive and represent the same sense in the explanation and interpretation which those historians themselves had in their hidden thoughts,

[18] Essays (Vol. II, German Trans., Leipsic, 1869, p. 143). Similarly, Cox, Mythology of the Aryan Nations, Vol. I.

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which they have, however, represented not with the true expressions but in other words? There can be a second more sharp-sighted and more probable interpretation devised. . . . Since that is so, how can you derive something certain from ambiguous things and give a definite explanation to the word which you find conveyed by countless kinds of interpretation? For how will you know what part of the tale is composed in customary representation, what, on the contrary, is disguised by ambiguous and strange expressions, where the thing itself contains no mark which yields the distinction? Either everything must be considered in allegorical fashion and so explained by us or nothing. . . . Formerly, it was customary to give allegorical speeches the modest meaning, to disguise dirty and ugly sounding things with the dress of proper nomenclature; now should things be dressed in obscene and nasty fashion!" These words written many centuries ago apply unchanged to certain excesses of modern nature-mythologists who, as for example, Siecke, explain the mythical motive of castration as representation of the waning of the moon, that of incest as a definite constellation of the moon to the sun. The psychoanalyst who knows the overdetermination of all mental phenomena, is, à priori, clear concerning the share which a series of conscious factors of the mental life must necessarily have had in the myth formation and throughout does not deny the significance of the naïve conception of nature for the formation of myths. How little the consideration of the unconscious instinctive forces excludes a consideration of the nature elements is best shown by the fact that the modern mythologists who devote themselves to comparative investigation agree in the essential points of the conception of myths with the results of the psychoanalytic investigation. Thus, Goldziher[14] declares, although in the confused naïveté of the nature mythology, that "the murder of parents and killing of children, fratricide and strife between brothers and sisters, sexual love and union between children and parents, between brothers and sisters, furnish the chief motives of the myth"; and Stucken, Jeremias and others call direct incest and castration the "motive of antiquity" that occurs everywhere in mythology. While,

[14] Der Mythos bei den Hebräern (The Myth Among the Hebrews), Leipsic, 1876, p. 107.

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however, psychoanalysis is able to recognize as mental reality these impulses, the significance of which it has learned to appraise from the actual life of the infant and the unconscious mental life of the adult, the nature interpretation still clings to its denial of these impulses by projecting them upon heaven. On the other hand, clearsighted investigators have emphasized the secondary rôle of the nature interpretation[15] and a psychologically oriented mythologist like Wundt[16] denies the standpoint firmly held by many mythologists, of a heavenly origin for myths as a psychologically impossible idea, while he conceives the hero to be the projection of human wishes and hopes.

It is the problem of psychoanalytic myth investigation to disclose the unconscious meaning of the phantasies underlying the myths which have become unrecognizable by relation to processes of nature and other distortions. This comes about by means of our insight into the content and mechanisms of the unconscious mental life which we study most clearly in the dream, but can also show in other expressions (as religion, art, wit, etc.). We therewith expressly oppose the misunderstanding which ascribes to us the conception of the old "dream theory" which derives certain mythical motives directly from the dream experience. Rather, we have recognized dream and myth as parallel productions of the same mental forces which produce also other creations of phantasy. At the same time, it should be emphasized that dream and myth are in no way identical for us. Precisely the circumstance that the dream is not intended, à priori, for comprehension, while the myth speaks for generality, excludes an identification of that kind. The condition of comprehensibility makes it easy to understand the difference between the poetic structure of a legend and the seeming absurdity of a

[15] In this same direction, says Stucken (Mose, p. 432): "The myth derived from experience was transferred to processes of nature and naturistically interpreted, not the reverse." "The nature interpretation itself is a myth" (page 633, footnote). Similarly, says Meyer (Gesch. d. Altert., Vol. V, p. 48): "In numerous cases is the nature symbolism sought in the myths only apparently at hand or introduced into them secondarily, as very often, in the Vedic and Egyptian myths, it is a primitive attempt at interpretation, the same as the myth interpretations appearing among the Greeks since the fifth century."

[16] Völkerpsychologie, Vol. II, Part 3, p. 282.

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dream picture by taking into consideration the especially intensive share of those mental forces to which Freud ascribes the "secondary elaboration" of the dream content by the conscious mental forces. Therewith, the myths, without withdrawing entirely from the inner structure of the dream, approach better-known mental structures which assume, as it were—as the name indicates—a middle position between the dream and those conscious forces: namely, the day-dream. The ambitious and erotic phantasies of boyhood and puberty return in the myth structure as content of a series of similar tales which are many times independent of one another. Thus for example, the myth of the exposure of the newborn hero in a little basket in water, his rescue and nursing by poor people and his ultimate victory over his persecutor (usually the father) is familiar to us as an ambitious phantasy of boyhood lined by erotic wishes which recurs in the "family romance" of the neurotic and discloses itself in many relations with the pathological ideas of persecution and grandeur of certain insane persons. When we are able to interpret the exposure in basket and water, on a basis of our knowledge of symbolism, as representation of birth, then we have in hand the understanding of the saga and at the same time the key to the discovery of its secret instinctive force and tendency. Thereby is disclosed the fact that symbolization serves, in general, to carry out in disguised representation the wish-impulses existing under the pressure of the repression; this symbolization can no longer be shocking to consciousness and yet affords the affects pressing from the unconscious for expression an almost equal substitute gratification. This is the most general formulation under which the mechanisms of unconscious phantasy formation and thus, also, those of myth creation, can be arranged. They serve, generally speaking, for the retention and distorted attainment of the mental pleasure that is destined for renunciation; on the other hand, for recognition of the material clothed in the wish, that is, really the denial of the unpleasant and painful experience which is demanded of man by reality. The result of both these strivings, which represent the fundamental tendencies of the mind, may be comprised under the viewpoint of wishfulfillment which utilizes these mechanisms

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as compensation for denied gratification or for the avoidance of compulsory renunciation in ever new and more refined disguises which we will shortly present in detail.

The mechanism of splitting of the personality into several figures representing its characteristics, also recognized in the dream life, recurs again in the form of the hero myth where the rebellious son gratifies his hostile impulses which belong against the father, on a tyrant who represents the hated side of the father-image (Vaterimago) while consideration is given to the cultural demands of piety by superlative acknowledgment of a beloved, revered, indeed even defended or avenged father-image. To this splitting of the mythical figures, there correspond openly in the hero himself, from whose standpoint the myth seems to be formed, similar "ambivalent" attitudes toward the persons in question, so that in the latest psychological solution, this mechanism is reduced to what we might call a paranoid explanation of the matter contained in the mind and its projection upon the mythical figures. A whole series of complicated myths which are provided with a great array of persons may be traced back to the three-cornered family of parents and child and in ultimate analysis, may be recognized as a representation disguised in justifying manner of the egocentric attitude of the child.

From the splitting, which is a means of representation founded on the very nature of the myth-forming phantasy activities, should be distinguished the similar mechanism of duplication of whole mythical figures (not merely isolated impulses split off from these), which is already recognized by certain modern mythologists (Winckler, Stucken, Hüsing and others) and may be traced through the whole history of myths and legends. Further, the psychoanalytic penetration into the saga structure here affords us insight into the purpose of this mechanism as a means of wishfulfillment and gratification of instinct, which can never take place in reality on the original wish object, but only after corresponding compensations in the sense of a continued series. Just as many dreams seek to fulfill as adequately as possible always the same wish-motive in a series of successive situations in different disguise and distortion, so the myth also repeats one and the same mental constellation until it is exhausted

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to a certain extent in all its wish tendencies. The case of duplication exists, for example, in a series of traditions which wish to portray the tabooed incest with mother, daughter or sister by duplication of the male or female partner. Examples of duplication of the male partner are afforded by the numerous legends and saga in which a king in full consciousness of his sin, wishes to marry his own daughter, who escapes from him, however, by flight and, after manifold adventures, marries a king in whom one easily recognizes again a double of the originally rejected father. A classical example of duplication of the female partner for the purpose of accomplishing incest is presented in the Lohengrin saga, in the first part of which the son saves the beloved mother from the violence of the cruel father, the succeeding marriage with the rescued one is accomplished only in the second part after the whole saving episode has been played again with a strange lady, a double of the mother.

These and many similar examples show that the duplication, often the multiplication, of individual mythical figures proceeds as a rule along with the duplication and multiplication of whole saga episodes which one has to bring to the covering, one might say to the condensation, which originally happened to them in the unconscious phantasy life. Thus with the splitting, duplication, symbolic disguising and projection of these mental elements, the shocking, somewhat incestuous content of the tale is obliterated in the direction of the repressing tendency, at the same time, however, the original tendency toward gratification is retained in the disguised form.

With these processes which become ever more complicated in the course of the progress of the repression, there appears also a gradual displacement of the affective accent from the originally important upon the unimportant, even to full inversion of affect or content of ideas as we know it from the dream structure. This is a necessary result of the incomprehensibility of the myths connected with the progress of the repression, upon which must always be put some kind of a conscious interpretation even if an incorrect one.

The mental distortion of motives and mechanisms mentioned affords the mythologist as well as the investigator who is ac-

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customed to fortifying himself with mythological material, helpful hints that in the estimation of this material, more foresight is demanded than the comparative myth investigation already rightly exacts and that still other factors, more influential and more difficult to understand than the historical foundations and the external fates of the mythical traditions, demand consideration. As the scientific investigator of to-day no longer utilizes any mythical product without bearing in mind the viewpoints of comparative investigation, so a demand for scientific certainty will insist that no myth be employed for indisputable demonstration which cannot also be considered as interpreted psychologically.

The myths, however, are not to be understood psychologically only by solution of the disguising symbolism and the representation of opposites, by the elimination of the splitting and duplication, by the tracing back of the arrangement and projection to the egocentric attitude of the unconscious which is shocking to consciousness. There is yet another factor to consider—aside from the mentioned dissection of myths lengthwise and crosswise—there is also a stratification in the dimension of depth which is peculiar to the myth in still higher degree than for example to the dream. Indeed, the myth is no individual product like the dream nor yet, as you might say, a fixed one like the work of art. Rather, the myth structure is constantly fluid, never completed, and is adapted by successive generations to their religious, cultural and ethical standards, that is, psychologically expressed, to the current stage of repression. This stratification according to generations may still be recognized to a large extent in certain formal peculiarities of the myth formation, wherein especially shocking outrages, which were originally ascribed only to the perpetrator of the mythical events, are gradually shared, in variously weaker form within the tale itself, with his ancestors and descendants or are represented in separate versions of the myth.

As originators, propagators and decorators of the so-called folk productions, we must think of solitary talented individuals on whom the progress of repression manifested itself most plainly and probably also earlier. Hence, the narrative, in course of its formation, apparently goes through a series of similarly constituted individual minds, among which, each worked, often for

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a generation, in the same direction in the assertion of the general human motive and the rubbing off of many a disturbing accessory. In this way, it becomes possible in long periods of time and under changed conditions of culture, that late versions and those adapted in their whole plan to the degree of culture, approach in individual points the unconscious meaning of the tale. How, on the other hand, the original religious myths established with real credibility, gradually lost their claim to earnest esteem in enlightened ages and finally lost it entirely, is shown plainly enough by the history of the Greek, Vedic and Eddaic traditions. With the real depreciation of the myth, there must, however, proceed also, since its mental reality in higher stages of culture can be still less acknowledged, a psychological depreciation: it is pushed out of the field of socially valuable function into the domain of fable, and since, as already pointed out, the share of the unconscious phantasy life gradually breaks through again more plainly, so the myth which can be excluded from the world just as little as the myth forming agencies can be from the mental life, can reappear at a certain stage of culture as legend, and be relegated by the highly developed people of civilization with condescending superiority to the nursery where indeed, in a deep sense, as a regression product, it belongs and where alone it can be really understood. It is like the case of primitive weapons, for example, bows and arrows, which were replaced with other corresponding ones by civilized people, living on in the nursery as playthings. Just as little as these weapons were created for children, so with the legend, as the scientific investigation long ago made certain; bows and arrows are kept by a number of peoples even to the present day; the legend may rather represent a sunken form of myth as the comparative investigation indicates. Psychologically considered, it is the last form in which the mythical product is admissible to the consciousness of adult cultured people. To the child with a gift for phantasy and filled with primitive affects, the legend, however, appears as objective reality because he stands in close relation to the time in which he must believe in the mental reality of his own similar impulses. The adults, on the other hand, already know that it is "only a legend," that is, a phantasy product. As

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the legend thus leads us back to a psychological starting point for myth investigation, so at the same time, it discloses to us the human starting point of myth formation, because it reduces the gods and heroes to earthly proportions and causes them to play their humanized fates in the setting of the family. With this complete elaboration of the purely human characteristics underlying the myth, the legend has prepared itself for the psychological conception and interpretation and will be welcomed in the analysis of the myth as a valuable aid, which not only enlarges the mythical material but often affords a confirmation of the conclusions drawn therefrom. The simple myth affords the material in relatively raw condition because it can relate to superhuman relations; the complicated legend reduces it to human proportions but in greatly distorted, in part ethically reduced form. Both forms considered as supplementary yield a complete understanding in the sense of the psychoanalytic conception which shows the motive that is shocking to our sensibilities, as a common human impulse among primitive peoples and present in the unconscious mental life of adult cultured persons and acknowledges its psychic reality.

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In order to explain the application of the fundamental principles methodically arranged, we will select as an example a widespread group of traditions, within which, the results of the psychoanalytic interpretation work may be substantiated by comparative legend investigation from the mythological standpoint. It concerns the romance of the two brothers which appears among various peoples of ancient and modern times in manifold forms; from the highly complicated version in Grimm's legends (No. 60), we will sift out the kernel of the tale in order to trace it back to the underlying basic psychological instinctive roots. In so doing, we will gain immediate insight, by comparison with less distorted or differently disguised versions of the story, into the proven mechanisms of myth formation.

In abbreviated form, the Grimm's legend runs as follows: There were two brothers, one rich and bad, the other, poor and upright; the latter has two children who were twin brothers and were as near alike as two drops of water. Their father once

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had the good fortune to stumble on a golden bird, for the feathers and eggs of which the rich brother pays well and by the enjoyment of the heart and liver of which he wishes to attain the attribute of laying gold. The costly morsels were, however, eaten unsuspectingly by the two hungry twin brothers, from which, each one now finds a gold piece under his pillow every morning. At the instigation of the envious uncle, the boys are exposed by their father in the forest.

There, a hunter finds them, brings them up and instructs them in woodwork; when they are grown up, he sends them into the world richly endowed. He accompanies them a little ways and, on parting, gives them a bright knife, saying: "When you separate from each other, stick this knife in a tree at the parting of the ways, then the one who returns can see how it has fared with his brother, for the side toward which this is pulled out, rusts when he dies; so long as he lives, it remains bright." The brothers come to a great wood where they are compelled by hunger to hunt to acquire, by the forbearance of the sympathetic game, a few helpful animals. Finally, however, they have to separate, "promise brotherly love until death and stick the knife which the foster father gave them, into a tree; then one goes toward the east, the other toward the west."

"The youngest,[17] however, came with his animals to a city which was entirely draped in black cloth." The reason for this he learned from an innkeeper to be that annually a pure virgin must be offered to a dragon which lived in front of the town and there was no one left except the king's daughter who, on the morrow, must meet the ignominious fate. Many knights had already attempted to match the dragon but all had lost their lives and the king had promised to the one who should conquer the dragon, his daughter as wife and the kingdom as inheritance. The next morning, the youth climbed the dragon's mountain, finds there in a chapel the power-giving drink which enables him to swing the mighty sword buried on the threshold and thus awaits the arrival of the monster. Then comes the virgin with a great retinue. "She saw from afar the hunter above on the dragon's mountain and thought the dragon stood there waiting for her,

[17] Literal, in spite of the fact that they are twin brothers

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and she would not go up." Finally, however, she had to approach the hard way. The king and courtiers went home and only the marshal was to witness everything from a distance. The hunter receives her kindly, consoles her, promises to save her and shuts her in the church. Soon after, the seven-headed dragon comes forth and calls the hunter to account. A struggle ensues, in which the youth strikes off six heads of the fire-spitting monster with two strokes (hydra motive). "The monster became faint and sank down and wished to be free again from the hunter but the latter, with his last strength, cut off his tail and because he could not fight longer he called his animals which tore it to pieces. When the battle was over, the hunter opened the church and found the king's daughter lying on the ground, because her senses had left her during the combat from anxiety and horror" (death sleep). When she came to herself he told her that she was saved. She rejoiced and said: "Now you will be my beloved husband." Her coral necklace she divided among the animals as a reward, "her pocket handkerchief however, in which her name stood, she gave to the hunter who went out and cut the tongues from the seven dragon heads, wrapped them in the cloth and carefully kept them."

The knight, weakened from the struggle, now lies down with the virgin to rest; the animals also soon all fall asleep after one had committed the watch to another. When the marshal, after he had waited awhile, came to look and found all asleep, he cut off the hunter's head, carried the virgin down the mountain in his arms and compelled her to promise to declare him the slayer of the dragon. She stipulated with her father the favor that the wedding should not be celebrated until a year and a day had passed; "for she thought in that time to hear something of her beloved hunter." On the dragon's mountain, in the meantime, the animals had awakened, saw that the virgin was gone and their master dead and blamed one another until finally it stuck on the hare. The latter withdrew from the strife and within twenty-four hours found a root which brought the master to life again. But in the haste, the head was put on reversed, "but he did not notice it, however, because of his sad thoughts about the king's daughter; only at midday when he wished to eat some-

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thing, did he see that his head was on backwards, could not understand it and asked the animals what had occurred to him during sleep?" Now, they had to admit everything, the head was again put on correctly and the hunter went sadly forth into the world with his animals.

After the course of a year, he comes again to the same city but this time on account of the marriage festival of the king's daughter, it was decorated in red. The hunter sent a message to the bride by his animals, at which, the king was surprised and sent for the owner. He entered as the seven dragon heads were placed on exhibition and brought the pretended dragon killer into difficulties by asking after the missing tongues; upon the latter's evasion, by producing these trophies of victory as well as the handkerchief and the coral necklace, he proves himself the suitor for the hand of the princess. The faithless marshal was quartered, the king's daughter was given to the hunter and the latter named lieutenant governor of the kingdom. "The young king had his father and foster father brought and loaded them with treasures. The innkeeper too he did not forget."[18] The young king lives contentedly with his wife and goes hunting accompanied by his animals. Once, while hunting a white doe in a neighboring magic forest, he lost his companions, finally the game and way both and must pass the night in the wood. A witch comes to him, who, under pretext of fearing his animals, throws a wand at him, by the touch of which, the animals and then the king himself are turned into stone (death sleep).

At this time, the other brother who thus far had wandered about with his animals without service, comes into the kingdom, looks at the knife in the tree trunk and recognizes from that, that a great misfortune has befallen his brother, but that he may still save him. In the city, on account of the great likeness, he is taken for the missing king and joyfully received by the anxious queen as the missing husband. He plays the rôle in the hope of being able to save the brother quicker; only evenings when he is brought to the royal bed, he lays a two-edged sword between himself and the young queen who does not venture to ask the meaning of this unusual ceremony (abstinence motive).

[18] In striking manner, however, the brother altogether.

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After some days, he goes to the magic forest, everything happens to him as to the brother, only he knows how to meet the old witch rightly and compels her to bring to life his brother and his animals (reincarnation). The twin brothers hereupon burn the witch, embrace each other joyfully and recount their experiences. When, however, the one learns that the brother has slept beside the queen, he strikes off his head in a fit of jealousy but is immediately sorry to have so rewarded his savior. Again, the hare brings the life root, with the help of which the dead is brought to life and the wound healed.

Hereupon, the brothers separate again but decide to enter the city at the same time from different sides. The old king asks his daughter which is the real husband, but she cannot at first recognize him; only the coral necklace which she had given to his animals gives her the right clue. At evening, when the young king goes to bed, his wife asks him why, in the previous nights, he has always laid a two-edged sword in bed. "Then he recognized how true his brother had been."

If the naïve hearer is asked the meaning of this legend, he will without much thought declare the representation of noble self-sacrificing brotherly love as the purpose of the narrative. It cannot, however, escape him that this chief content is joined to a series of adventures which stand in more or less loose connection, that further, the simple moral of the story is set in the scene with a disproportionately complicated apparatus and that finally, the fairly thick moral coat itself is pierced in more than one place by an ethical unscrupulousness, such as otherwise characterizes the legend as a product of antiquity and childhood. If one would now look at some of these peculiarities, such as the decking out with wonderful traits, the frequent repetition of detail, the fusion of different motives, etc., as meaningless results of that day-dreaming pleasure of fabulating which has a certain share in the spreading of the legendary material, still there always remains a series of typical basic motives which demonstrably arise from mythical times where the narrative often enough had a quite different sense and a purpose, foreign to us. In its present form, the legend is not original and further not a unit, hence it can also never be interpreted in its entirety, as sentence

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for sentence traced back to its unconscious meaning; rather, it has become what it is from compulsion of circumstances and the tracing back of its course of development will also earliest afford us conclusion regarding its real meaning and the reason for this change in significance to which it has been subjected in the course of time. Because of this manifold complication of the mythical structure handed down to us, we can always undertake an interpretation only of individual motives and must therefore dissect the product in hand just as we do a dream for interpretation, into individual elements which are at first to be treated independently; to this, the comparative investigation affords us the quasi-associations which the myth-forming whole has contributed to the individual themes in course of their elaboration.

In the foregoing legend, one easily distinguishes a narrative forced into the center of things: the liberation and marriage of a virgin destined for sacrifice to a monster, by a clever youth (savior motive); before this, a previous history, and after it, a related conclusion, both of which surrounding parts contain the real brother motive.

The previous history of the twin brothers exposed by their father (exposure motive) has itself an introduction in a report of two entirely different brothers of the preceding generation, in which may be seen duplications of the real twin heroes carried out as a favorite decorative tendency. Deeper analysis reveals in them, however, according to the familiar scheme of the myth of the birth of the hero, splittings of the father image, by which the "bad father" is made responsible for the exposure, while the "good father" permits[19] it, though unwillingly, and appears again in course of the tale, as the helping hunter who lovingly rears the boys, but then likewise sends them forth into the world (exposure motive). The beginning of the legend would thus prove in direct and undisguised representation that a father, after he

[19] With the motive of "gold laying" introduced at the foundation of the exposure from a foreign connection, we have nothing further to do here. In a certain closely related sense, the gold-giving bird represents both the father and the attribute of gold distributing among the sons for their material independence.

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has lovingly reared and prepared his children for the world, pushes them out of the parental home.[20]

With this actual exposure of the sons[21] to the rough reality of life, begins the real previous history of the hero's adventures: namely, the necessary separation of the brothers (separation motive) and the mutual vows of faithfulness over the sign of the shining knife, which motive will only later become clear in its significance.

There follows, now, an especial elaboration of the whole independent motive of dragon combat and the freeing of a virgin, which we recognize as typical constituents of the mythology of various peoples. We may, therefore, without reference to the brother motive, consider, so much the earlier since the brother does not appear at all there, the savior episode, in order to make us familiar with some of the peculiarities of myth formation. If one reads the detailed description of the sacrifice of the virgin in the legend, with a certain inclination toward psychological understanding, then it is difficult to mistake the purely human content. The decoration of the city, the gay pageant which accompanies the pure virgin to the chapel and leaves her there to her inevitable fate, all that agrees so well, as if it referred in secret to the wedding of the princess who is anxious in maidenly fear of her

[20] In the beginning of the legend, the ancient motive has found direct presentation in the exposure of the children by their father; in the relation to their good foster father, it seems already inverted into its opposite, since the two brothers refuse the acceptance of food and drink until the hunter allows them departure into the world: Then spoke the old man with joy, "what is happening to you has been my own wish."

[21] The secret meaning of the exposure we may leave out of consideration here, where the birth of the hero may not be followed further; we may point out, however, that other versions of this widespread legend contain the typical exposure of the boys conceived by the drinking from an enchanted spring, preserved in chest and water and, further, that the helpful animals of the hero myth recur in our legend, and here as there, represent important representatives of the helpful parent images, who were spared by the child in pious manner after they have provided two young ones (twin motive) for the assistance of the heroes. To the watery birth point the names of the boys, who are sometimes called Water Peter and Water Paul, sometimes John and Caspar, sprung from the water, Wattuman and Wattusin, strong spring and lovely spring. As reverberation from this, is to be noticed the reference in our legend that the two nameless boys resembled each other "like two drops of water."

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future husband and sees in him, in expectation of impending mysterious events, only a monster that has aimed at her destruction. That this conception has not been entirely foreign to the legend itself is betrayed by the place where the princess when she "saw the hunter from afar above on the dragon's mountain, thought the dragon was standing there awaiting her and she would not ascend." Thus, she identified the dragon directly with her later bridegroom and husband, though of course, only in transient and erroneous fashion, from which, however, we may read the echo of a deeper psychological significance of the motive. We can prove this view, however, directly from parallel traditions which utilize the same motive in the sense of our interpretation. In the old popular Milesian legend, which the Roman poet Apuleius has handed down under the title "Eros and Psyche," the oracle commands the royal father of Psyche to conduct his daughter with full wedding pomp and festal train to the top of the mountain and there to leave her to the son-in-law sprung from the dragon-race; "so Psyche attends in tears not her wedding but her funeral celebration" (also in our legend, the city was dressed in black).[22] But here, too, the virgin did not fall to the expected dreadful dragon, which did not show itself at all, but becomes the wife of Eros, the god of love himself, who visits her every night as an invisible husband until the inquisitive Psyche, goaded by her sisters, one night convinces herself against the command of her beloved that, instead of the pretended monster, a handsome youth rests by her side who now leaves her as punishment. This legend shows with all desired clearness that, in the offering of the untouched virgin to the horrible dragon, we are dealing with a wedding which is hallucinated by the anxious virgin in unmistakable neurotic fashion as awful overpowering by a horrible monster. Thus, if the dragon represents in one stratum of the interpretation the feared and detested animal side of the husband, then there can be no doubt that it is the sexual side of the man which has first found expression in the dragon symbol. That to this dragon, here as

[22] The affixed death motive naturally has its own significance which, nevertheless, must be passed over in this connection. It finds partial explanation in the later mentioned motive of reincarnation.

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in other myths, in course of time, all the pure virgins of the land must be sacrificed, makes us all the more sure of its phallic significance; that it has other meanings besides, indeed must have, since this one discloses the sense of the legend only a little way, we shall have to show in other layers of the interpretation; nevertheless, we may even now assert that these different meanings (and also other meanings) do not in the least exclude one another, but rather, to a certain extent, converge toward one point. That the virginal anxiety preceding the carrying out of the sexual intercourse rules the dragon episode in this plain interpretation is shown also by the conclusion of the scene, which does not, as one would expect, end with the actual marriage, but with a one-year abstinence, which the bride stipulates or to which in many traditions the hero voluntarily agrees (motive of abstinence). Only after the expiration of this time does the wedding take place, which should logically, as in the legend of Eros and Psyche, follow immediately, so that it gains the appearance that the pleasantly and unpleasantly toned attitudes toward the sexual act were so unbearably opposed to each other here that they must be placed in two temporally separated scenes, which otherwise seem joined. The deeper significance of this characteristic, as well as of the whole interpolated episode of the faithless marshal, can only become intelligible when we have traced back to its unconscious foundations the real brother motive, to the analysis of which we will now apply ourselves.

The final, especially contradictory part of the legend, with the fratricide so grossly opposing the tendency of the tale, most needs explanation, but promises also to lead deepest into the underlying mental strata. Before we proceed to prove this by comparison with less distorted versions of the same motive, we will seek to determine how much nearer the application of our fundamental principles to the material at hand brings us to the meaning of the narrative. In the conjugal substitution of one brother by the other, as well as in the jealous murder of the rival brother resulting therefrom, we recognize, in spite of sentimental amelioration which these motives have here undergone, primitive traits of primeval love and mental life, the grossness of which is artificially hidden by the "good ending" of the story.

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The evil reward, which is apportioned to the savior for the rescue of the brother, lets us suspect that originally it must have dealt with an actually hostile relationship between the brothers throughout and a more fundamental jealousy. If we do not dodge recognizing the fact that these powerful affects of jealous brotherly hatred and the necessary renunciation of its satisfaction is, in reality, one of the instinctive forces of legend formation, then, both the dragon combat, as well as the concluding episode of the faithless marshal, becomes clear, at the same time as the still further distorted duplication of the same primeval motive, which succeeded in breaking through in sentimental amelioration in the concluding episode. In all three scenes, we are dealing with the elimination of an opponent who seeks to rob the victorious brother of his life and bride in order to assume his place in the conjugal bed. If, however, the wicked dragon, as well as the wicked marshal, represents a personification of the hated brother image, which arouses sexual jealousy, then we understand also why the beloved brother image separated from the fraternal companion (separation motive) before the dragon combat and does not appear in the next two episodes: namely, it is represented by the two substitute figures of the dragon and the marshal, in whose killing the brother is also eliminated. Therefore, the young king, in his new happiness, allows all his relatives and even the innkeeper to come and rewards them, while the slain "brother" is consequently not mentioned. That the faithless marshal personifies the hated side of the "loyal" brother is hinted at in the circumstance that both persons were brought into the same situations toward the successful brother, as, for example, in the duplicated recognition scene, where the hero, as possessor of the necklace, is proven the rightful husband both against the marshal and the brother. That the dragon should also represent the brother to be combated is nothing strange. We recognize a similar relation, for example, in the Siegfried saga, where the hero, at the instigation of his foster father, Regin, kills his brother, who is watching the treasure in the form of a dragon, and in further course of events, likewise wins for himself the virgin. Other relations of the Siegfried saga to our legend will be mentioned later. Striking only is the threefold

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repetition of one and the same fundamental situation which varies—as in many dreams—in ever plainer representation of the opponent (dragon, marshal, brother), the motive of rivalry with the brother for the possession of the same wife and the elimination of the rival.

How much this motive originally stood in the central point of the narrative is plainly shown by another, in many points less distorted version of the same legend, which will also disclose to us the meaning of certain hitherto uninterpreted motives. This is the so-called oldest legend of world literature, which was fixed in literary form some 2,000 years ago, in the Egyptian story of the brothers Anup and Bata. "Now Anup had a house and a wife, while his younger brother lived with him like a son." One day, the elder brother's wife attempted to seduce her young brother-in-law. The latter, however, indignantly repulsed her without saying anything about it to his brother. She now slandered Bata by saying that he had done violence to her. "Then the elder brother became enraged like a panther, sharpened his knife and took it in hand" to kill his younger brother when he should come home at evening. The latter, however, was warned by the animals of his herd (motive of helpful animals)[23] and fled. "His elder brother ran after him with the knife in his hand." The younger brother appealed to Re; the god heard him and caused a great water to arise between them, on the shores of which, they pass the night separately. When the sun rises, Bata defends himself before its face, tells Anup the base proposals of his wife, swears his innocence and castrates himself as a sign of his purity. "He hereupon drew forth a sharp knife, cut off his phallus and threw it into the flood where it was swallowed by a fish." When Anup, now full of remorse, began to weep, Bata begged a favor. "I will take my heart and lay it on the flower of the cedar tree and when anyone shall give you a glass of beer and it foams, then it will be the time for you to come and search for my heart!" (motive of true love). Anup went home, killed his wife and threw her body to the dogs; then he sat down, put dust on his head and mourned for his brother.

[23] The cow, which warns him first, represents the repentant wife herself, as in general, most animals of the legend in the figure of helpful or harmful beings, represent closely associated people.

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Meanwhile the latter lives in a cedar valley. The gods praise his chastity and give him a wish. He asks for a maiden and they jointly create one for him. He lives with her and confides to her the secret of the heart in the cedar blossoms. But her lighter mind, her curiosity and lustfulness cause her to disobey the only prohibition of her husband: she comes near the sea, the waves snatch off a curl which floats to the laundry of the king of Egypt. The king has the possessor sought out, finally makes her his wife and in order to avoid Bata's revenge, at her wish, has the cedar cut down.

Bata drops down dead (death sleep). His brother notices the misfortune as was predicted, on the foam of his beer and hastens into the cedar valley. Three years he searches for the heart; in the fourth, he finally finds it and gives a drink to the dead Bata. Then the latter awakens and embraces his brother (reincarnation).

Then Bata changes into an Apis bull and has himsellf driven by his brother to the court of the king of Egypt. The bull allows himself to be recognized by the queen as Bata. The queen is frightened and brings it about in an hour of love that the king has the bull slain. Two drops of blood fall to the ground at the gate of the palace; two giant sycamores shoot up in a night (hydra motive). Again Bata allows himself to be recognized in them, again the queen brings about the cutting down of the trees. While this is being done, a splinter flies into her mouth, she becomes impregnated and bears Bata as her son (rebirth motive). The king dies, Bata becomes his heir and has the queen executed. After a thirty-years rule, dying, he leaves the crown to his brother Anup.

Before we investigate the individual motives in their relationship to the German brother legend, we will first seek to comprehend the whole content and structure of this noteworthy story, of which H. Schneider[24] says: "If one overlooks an historical or mythological nucleus and considers the story entirely isolated and for itself alone, then one may be tempted, at first, to see in it nothing except an external union of heterogeneous elements, a phantasy play of fleeting ideas. All unity and logic

[24] Kultur und Denken der alten Ägypter, 2d ed., Leipsic, 1909, p. 257.

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seems lacking. . . . The figures change as in the dream . . . the stage is likewise indistinct . . . nevertheless, toward the poetic work, I am never free from the feeling of the most complete inner unity, most complete artistic control, most complete logical development. Only, unity and necessity do not lie in the gay pictures themselves but behind these." If we attempt, by means of our psychoanalytic basic principles, to derive this hidden meaning of the narrative, we recognize first in the different episodes of the Egyptian tale, likewise duplications of the one fundamental situation, the less disguised representation of which, in distinction from the German legend, here precedes, while the distorted variations finally carry out the longed for gratification of the tabooed wish. Thus, the king of the second part reveals himself as a socially elevated double of the elder brother, and the wicked queen is an equally plain double of the wicked wife of Anup, so that Schneider comes to the conclusion: "These two women are precisely one person" (p. 260). And, as in the German legend, the hated brother appears in continually new figures as dragon, marshal and finally in his real rôle, so also does Bata appear as bull, tree and finally in human form, as rebirth of himself, being brought forth by the mother as his own son. His nominal father would then be the king, in whom we recognize a double of the elder brother, who, according to the wording of the legend, really represents the father's place. Thus Bata strives from the beginning to seduce the "mother," whom he, in the second part, ever pursues in symbolical disguise, which plainly betrays that the slander by her at the beginning of the narrative is to be considered only as a projection of his incestuous wish. If the Egyptian version thus disguises the ground for the bitter rivalry of the brothers as inclination toward the same irreplaceable incestuous object,[25] it recognizes also the corre-

[25] In an Albanian legend, which deals with the liberation of a king's daughter sacrificed to a monster (Lubia) (corresponding to the dragon combat of the German legend) the story runs, that the hero has saved his own mother (saving phantasy) and taken her to wife, while he accidentally kills the king, her father (= monster), and enters upon his inheritance (Hahn, Griech. u. alb. Märchen, Leipsic, 1864, No. 98). Here it may be pointed out that the heroes of the Greek saga, Perseus, Apollo, Bellerophon and others, always kill a monster (Gorgon, Minotaurus, etc.) as the sphinx-killer, Œdipus, his father.

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sponding punishment for the forbidden realization of this desire: the castration. That this was originally caused by the jealous rival (brother, father) and not in a kind of confession of the forbidden wish, by his own hand, is shown, not only by the comparative myth accounts, but also by the Egyptian legend itself, even if only in disguised and diminished form. From Bata, changed into an Apis bull, the symbol of masculine virility, the head is struck off at the command of the king and the sycamores, springing up from the drops of blood gifted with power of wonderful growth, the splinters from which have the power of masculine fructification, are likewise inexorably cut down. In both motives, because of numerous individual psychological experiences and mythological parallels, we must see symbolical representations of the castration, undertaken in the first part, which is the original vengeance of a jealous rival. Especially is the cutting off of the head, which here next interests us, already recognizable in an external detail, as substitute for castration, namely, in the fruitful drops of blood which elsewhere regularly flow from the severed phallus.[26] If however, the beheading of the Apis bull by the king is a symbolical (disguised) expression of the castration carried out on a rival, so we may also introduce this meaning into the German legend, and find, accordingly, that the young king struck off the brother's head when he received the information of the latter's taking his place in the conjugal

[26] Thus, at the castration of Uranus, arises Aphrodite, like Bata's "artificial" god-maiden. Plain echoes of the Egyptian legend are shown in the tale of the hermaphrodite, Agdistis, at whose castration there sprang from his blood a pomegranate tree (= new phallus); the fruits of this stick Nana in her breast, from which she becomes pregnant and bears Attis, who is later made mad by his jealous mother and castrates himself under a pine tree (like Bata). From the blood sprout violets. On the spring festivals of the god-mother, a mighty pine was cut down as symbol of castration; as in the Egyptian legend, the sycamores sprang from the blood. Agdistis himself sprang from the semen of Zeus spilled on the ground from Kybele struggling against his violence; in same manner, arose Erichthonios and other beings from spilt semen, to which, at other times, the blood corresponds. That also, the fruits of this phallus tree, which stuck Nana in her breast, are to be interpreted purely sexually, is shown by the myth of Zagreus, who, under the pretext of castrating himself, threw the testicles of a ram into the breast of the impregnated Deo.

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bed. The reincarnation in the German legend corresponds to the rebirth in the Egyptian. But further, the previous beheading of the brother by the marshal we will consider in the same sense as the castration of the unwished for rival, as on the other hand, the cutting off of the dragon's heads[27] and still more plainly the cutting out of the dragon's tongues points to the revenge. In this connection, we think we recognize also in the motive of vowing faithfulness by the knife stuck in the tree the last remnant of the old castration motive which is already ethically disallowed. The knife corresponds to that with which Anup pursued his brother, but further to the two-edged sword which the intruder lays between himself and his brother's wife. The sticking it in the trunk seems thus a last echo of the cutting down of the tree (castration) and it becomes conceivable, how either of the two can recognize in this instrument, according to his wish, that the brother has died.

As in the Egyptian legend, so we distinguish also in the German, a series of successive scenes, which ever more plainly represent in variously clear guise, the rivalry with the brother, the mutual incestuous object of love and the castration of the hated rival.

In how explicit manner these ancient motives originally rule the legendary material is shown in many points still plainer than in the Egyptian legend, by the myths of Isis and Osiris underlying this legend, in the chief characteristics of which we will orient ourselves without taking into consideration in detail the distortions and complications adhering to them.

The earth god Keb and the heaven goddess Nut have four children: two sons, Osiris and Seth, and two daughters, Isis and Nephthys. Isis became the wife of her brother Osiris, Nephthys that of Seth; Osiris, however, ruled the earth as king and became

[27] Psyche, of whom it is characteristically said: "in the same being, she hates the monster and loves the husband," is informed by her sisters "that a horrible dragon twisted into many knots, with poison swollen, blood-engorged throat and hideous craw, sleeps with her nights." The sisters counsel her to steal to his couch at night, when he is asleep: "boldly raise the right hand and with all her power, sever with the two edged sword the knots of the dragon which bind the throat and head together."

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hated unto death by his brother Seth, who enticed him by stratagem into a chest and hurled this into the Nile. Plutarch's version gives as reason for this enmity of Seth against Osiris, that the latter had unwittingly had intercourse with the wife of Seth, thus his own sister, Nephthys. Isis starts in search of the corpse of her husband and finally finds it and brings it into the forest. Seth discovers the hiding place and dismembers the body of his brother. Isis collects the scattered members and puts them together again; only the phallus is missing, it had been borne to sea and swallowed by a fish (as with Bata). She replaces the missing member of the dead by one made of wood of the sycamore (tree phallus) and founds, as a memorial, the phallus idol. With the help of her son, Horus, who, according to later traditions, had been begotten by Osiris after his death, Isis avenges the murder of her husband and brother. Between Horus and Seth, who were originally brothers themselves, arises a bitter struggle, in which the combatants tear off from each other certain parts as power-bestowing amulets; Seth dug out an eye of his opponent's and swallowed it but lost at the same time however, his own genitals (castration) which—according to a remark of Schneider's—had originally certainly been swallowed by Horus. Finally, Seth is compelled to give the eye back, which Horus gives to the dead Osiris, and thereby brings him to life so that he can go to the kingdom of the dead as ruler.

The Osiris myth, into the interpretation of which we cannot enter here, shows plainly that the rival had originally actually filled his brother's place in the conjugal bed and that his castration followed from the jealous brother. Further, the phallic significance of the sycamore, as well as the conception of these being cut down as castration, is here substantiated, for Isis prepares a replica out of sycamore wood in place of the missing member, which, like that of Bata's, had been swallowed by a fish. Further, this motive, in symbolical dress, exists in the Osiris saga. On the place where the dead remains of Osiris rest, springs up (according to Plutarch, c. 15 ff.) a tamarisk, which the king orders cut down in order to have a column prepared from it. Isis, who serves at the court, claims the column and brings to life the dismembered corpse of Osiris by her kisses so

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that he again possesses creative power; she becomes the mother of a child with crooked, powerless legs (symbol of castration), a new incarnation of Osiris. Thus, we find here also the incestuous rebirth from the own mother as with Bata, Attis and many others, as powerful motive, and with this, a basis for understanding also the motive of reincarnation in the legend. If the cutting off of the head is a symbol of castration, "displaced upward," so the replacement of this, signifies the compensation for the phallus, as in the Osiris saga; as the reincarnation in the German legend results from the eating of a root, in the Egyptian from the delivery of the heart lying on the cedar tree, and in the Osiris saga, from the swallowing of a torn-out eye, a remnant of the original motive in the Horus-Seth combat betrays to us that it really deals with the incorporation, the reattainment of the lost genitals, which the rebirth from the own mother and the coincident overcoming of death, render possible. Thus, it becomes evident that the hero brings back to life, not only the dead brother (as his son, that is however as himself) but also snatches away the princess from the kingdom of the underworld (which the dragon also represents). Now we know, however, from analytic experience and mythological evidence, that the saving phantasy regularly concerns the mother and we should, therefore, also conceive the first reincarnation of the hero, resulting therefrom, as incestuous rebirth. This is so much the easier confirmed, since both the Osiris myth and also the legend of Bata, plainly attest the incestuous significance of the courted sexual object. If we transfer this interpretation into the German legend, then we understand that there can be absolutely no mention of the mother of the brothers, since she is hidden behind the other female persons of the narrative; we comprehend also, the voluntary renunciation (motive of abstinence) of sexual intercourse, as it finds expression in the one year abstinence and in the motive of the laying down of the sword (symbolum castratis),[28] on the one hand as refusal of incest, on the other hand,

[28] The common practice of tracing back the motive of separation by a sword to the historical custom of match-maker and the marriage ceremony symbolically completed with this, does not explain, especially the special symbolism applied therewith, and seems, therefore, to be compelled

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as ambivalent penitential attitude for the accomplished murder of the rival (father, brother). Not only in the friendly figure of the giver of life and of the longed for sexual object, does the mother appear in the legend, but also in the figure of the fearful goddess of death, who will transfer one into eternal sleep (death-like condition of the conqueror of the dragon; petrification), and whom the hero must overcome like the other evil forces. Therefore, Bata has his mother and wife, after she has borne him again, executed, and in the German legend, the witch is burned after she has brought the petrified brother to life.

We interrupt the interpretation here, which may be still further followed[29] in individual details, in order to gain a general viewpoint for the psychology of myth formation. To this end, we need only to proceed to the reduction of the mythical persons to the egocentric figure of the myth-maker. It must strike us that the two brothers are twins who resemble each other not only physically, "like two drops of water," but also in their characteristics and attributes (they have the same animals, same

to yield to a mythical conception, the foundation of which, F. v. Reitzenstein (Zeitschr. f. Ethnol., 1909, p. 644–683) has pointed out in the marriage customs of primitive peoples. According to this, the sword utilized in the traditions quoted, as symbolum castratis, serves originally for the fructification in form of a stick or staff, which the husband lays between himself and his young wife the first three nights, during which he abstains from coitus. From ignorance of the causal relationship between sexual intercourse and pregnancy, he yields in the first three nights, in a manner, to a god, the jus primæ noctis for miraculous fructification, only after whose pretended entrance may he first indulge in sexual pleasure.

[29] Aside from further psychological interpretations, we forego also any natural mythological interpretation which might be possible. Thus, it is not excluded that the city at different times one year apart, now decorated in black, now in red, has reference to a definite sun-constellation (or moon phenomenon?) just as it remains striking that the production of the herb for the revivification of the sun hero took into consideration exactly twenty-four hours. If one takes notice of the reversed position of the head when he awoke and its reversal, at noon (as the sun changes to descent), then the interpretation of individual motives by projection upon nature processes becomes probable. Still, these interpretations in no way exclude the psychological sense of the narrative, but rather demand for comprehension the tale in human guise and the myth-forming forces of instinct which can scarcely be exhausted in the description of processes of nature.

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clothing, etc.), and are also not distinguished by names, so that the queen recognizes her husband only by an artificial sign. Whenever there is anything suitable for a duplication, it is applied to both brothers, of which the one is an exact stereotype of the other; with this reduction of the two brothers to one person[80] would go, however, the chief sense of the narrative, the rivalry of the brothers for the mutual object of love, if we did not remember that originally one brother was an elder one and represented the father to the younger, as is plainly stated in the legend of Bata. (As remnant of this older version, the German legend speaks in one place still of the "younger" brother, although it presupposes twins.) But also in the German legend, the dragon, who claims the princess, and the old king, who will not give her up, represent the father, as indeed the courted woman, according to our interpretation, stands for the mother. Both assumptions are abundantly confirmed by variants of the brother legend, which begin with the statement that a jealous king shuts up his daughter from the world, the latter, however, conceives in a miraculous manner (incest-fructification) and becomes the mother of twin brothers, whom she exposes; one of the brothers then marries, as in the quoted legend of Lubia, page 453, note 25, in the king's daughter, his mother and after the death of the old king (the father), inherits the kingdom. Thus, in these legends, we are dealing with a displacement of the hostile and jealous impulses, which were originally directed toward the father, upon the elder, favorite brother (and upon the sister instead of upon the mother), which substitution may still be followed in the Osiris myth with its serially arranged generations.[81] This mythical displacement reflects a bit of primitive cultural achievement which, with the leveling of the previously so dissimilar enemy to a double of the

[80] In certain legends of this group, appears as a matter of fact only one "brother." Compare for example in "Schwedische Volkssagen," trans. by Oberleitner, p. 58 ff.

[81] The Osiris myth shows still further in course of its development how, from the original murderer of the brother, he becomes his avenger. Originally, Thoth besides Seth is the murderer of Osiris; later, he appears in the struggle of Horus against Seth as physician and umpire. Finally, he has become directly partisan of Osiris and fights for him against Seth (compare Schneider, *l. c.*, p. 445 ff.).

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twin, has found an ethically satisfactory conclusion in the pious brother legend.

But the development resting on the progressive repression of these primitive impulses, does not stop with this form of amelioration, but creates still further disguised forms of expression, which become comprehensible to us on the basis of the psychological interpretation of the brother motive. The Grimm brothers have already called attention to the internal relations between the Siegfried saga and our legend.[32] Here may be mentioned only that Siegfried leaves the virgin, rescued from the dragon like the hero of the legend, that he, however, like the latter, attempted to assume the place of the rival in the conjugal bed, indeed is finally directly compelled by Gunther to subdue for him the too powerful maid.[33] Siegfried also lays a two-edged sword between himself and the woman, but the ignominious death which he suffers speaks still plainly for the fact that he originally must have been in reality the favored rival. Only here, the relation of rivals is weakened to blood brotherhood.[34] Still further goes the

[32] W. Mannhardt (Germ. Mythen, p. 214 ff.) has shown the agreement of our group of legends with the Indian saga related in the Mahabharata, "that Indra after the death of the dragon, Ahi (after the murder of Vritras), yields himself to banishment, another takes his place and wishes to marry the wife of the god, then Indra comes back and kills the intruder." Mannhardt thinks that "the other may be traced back to a figure as nearly related and brotherlike to Indra as Agni." Agni is called Indra's twin brother and a "grandson of the flood" (apam napat). Further, Mannhardt calls attention to similar traits in the myths of Freyr, Thor and Odin (pp. 221–223).

[33] Her deathlike sleep corresponds to the motive of petrification in the legend and points to her maternal rôle toward the hero, which is also evident from other signs.

[34] In this group of legends belong, according to Grimm's assertions, also the saga of the blood brothers, of whom one assumes the place of the other with the wife, but lays a sword between them and is finally struck with leprosy (according to Grimm, petrification), from which his true friend frees him by the blood of his own children. These are then brought to life again by the rescued one by a miracle. Likewise belongs here the legend of "True John" (No. 6) for whose rescue from petrification (revivification by blood), the king strikes off the heads of his own sons, which the true John again returns to them. In one version, this is the foster brother of the king. Also, the legend of life water (No. 97) and many another would become comprehensible in many points on the

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amelioration of the shocking relation in one group of German saga, which are handed down to us only in late writings: the Ortnit-Wolfdietrich Epic. Ortnit, with the help of his father the dwarf king Alberich, wins the daughter of the heathen king Machorel, who is accessible to no suitor, and elopes with her to his home (Gardasee). The old heathen king, feigning reconciliation, sends rich presents, among them, two young dragons (twin motive) which, when they grow up, devastate the land. Ortnit allows the monster to exist in spite of the counsel of his wife and tells her, if he should fall, to offer her hand to his avenger. Without followers, he rides in the forest, sinks into so deep a sleep (petrification) that neither the approach of the monster nor the baying and snapping of his dog awakes him (helping animal). He is killed by the monster.

In the saga handed down to us, the young hero, Wolfdietrich, avenges him, in the childhood story of which, the motive of the father, who shuts up his daughter, the slander of the wife by the rejected suitor, the exposure and other motives play their parts in familiar significance. In the combat with his brothers over the inheritance, Wolfdietrich flees to Ortnit for help. When he learns of his death, he does not hesitate to avenge him. Like the second brother in the legend, he encounters almost the same fate but is able, in the decisive moment, to save himself by Ortnit's sword. He conquers the dragon, as well as the rebellious vassals, and receives as reward the hand of Ortnit's widow, by whose help he conquers the brothers and gains his kingdom. We easily recognize the familiar characteristics of our legend again and must conclude that Wolfdietrich avenged the death of his brother and married his widow. That is now demonstrable of course, if not in the superficial historical strata, still, in the underlying mythical layers of the narrative, and long known to investigators. If we follow Jiriczek's comprehensive representa-

basis of our interpretation. For the arrangement of all these traditions in the group of brother legends, Wundt (Volkerpsychol., Vol. II, Part 3, Leipsic, 1909, p. 271 ff.) takes accordingly the term of the twin legends in a broader sense, since he includes thereunder "all the legend or myth material in which two personalities, who belong to the same generation, appear by their actions in a friendly or hostile relation. . . ."

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tion of German Hero Saga (Sammlung Göschen, No. 32),[35] we learn that in the tradition before us two saga of different origin, which have nothing to do with each other, are united: a mythical one of Ortnit, and the historical one of Wolfdietrich, in which the latter may stand in place of a mythical figure belonging to the Ortnit saga. A purer version of the Ortnit saga may be contained fragmentarily in the Thidrek saga, where King Hertnit falls in combat with a dragon, a hero (Thidrek of Bern) conquers the dragon and marries the widow. "From the allusions and fragments of saga of Scandinavian tradition, an older form of the saga may be determined, in which the brother of the fallen assumes the rôle of avenger. This mythical pair of brothers are called in Northern terminology "Haddingjar," German "Hartungen," compare the name "Hartnit" (Hertnit) from which Ortnit is distorted. Guided by these names, Müllenhoff has derived in clever manner the connection of the Hartungen saga with an east Germanic Dioscuri myth" (Jiriczek, p. 146 ff.).[36] If the original brotherly relation of the two heroes is here fixed by comparative myth investigation, then we recognize on the basis of our interpretation, behind the pious office of avenger, the real relation of rivalry, and know that in the deeper sense of a psychological interpretation, the prejudiced brother slays the favorite rival in the form of a dragon in order to possess his widow, quite like Œdipus in the Greek myth. The replacement of the brother by a monster represents therewith a special form of duel with the unknown father, which is reported in numerous traditions, also of Ortnit and his overpowering father, Alberich.[37]

[35] One compares also the most recent special work of H. Schneider: Die Gedichte und die Sage vom Wolfdietrich, Munich, 1913.

[36] Also the Dioscuri motive itself, the avenging of the stolen and disgraced sister by a pair of brothers, which exists with various peoples, originally has as content the struggle of two (twin) brothers for the mutually loved sister (representing the mother), which may have ended with the castration of the opponent, of which, according to the keen surmise of the natural mythologist, Schwartz, an echo in meaning may still be contained in the name of the Greek Dioscuri, Castor (from castrare).

[37] This shows prettily (communicated by R. Köhler, Kl. Schr., I, 21 ff.) in a Gaelic legend (variant of Grimm's legend No. 21), where two brothers court a knight's daughter and, unknown to each other, fight together.

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This unrecognized duel itself is the counterpart of unrecognized (incestuous) sexual intercourse, which is represented in our group of legends by the motive of the exchange of husbands (weakened by the symbol of chastity).

Thus, in ultimate analysis, the legend leads back to the primitive family conflict with the overpowerful father and represents for the prejudiced son or youngest, in disguised dress, a wish correction of the unpleasant adaptation to reality. If we have noticed that the myth structure, with the progressive amelioration of ancient abomination to pious human esteem and love of relatives, reflects a piece of ethical cultural development, so too it should not remain unmentioned that in addition, inconceivably old remnants of primitive affect life continue to live in this legend. It shows, thus, of course the development of the ethical feeling but not in the form as it has really come to be, namely, with renunciation of earlier sources of pleasure and final adapation to the hard demands of reality, but always with the retention of the old primitive modes of gratification, which find symbolical fulfillment in the form of disguised wish phantasies under the superficial moral layers.

A typical example for the legend in this regard, that discloses at once the primitive human nucleus of the mythical dress, has been afforded us by the exhibition of the history of the legends of the brothers. In the ultimate analysis, there exists in almost all mythical structures, the old unlimited power of the pater familias, against which the son in the original strata of the phantasy formation rebels. If there inheres in the father, as the primitive relations presuppose, unlimited control over the life of the male members of the family (including the sons), and over the bodies of the female members (including the daughters), then it is conceivable that the struggle of the son aims to attain this prerogative of the "father" for himself, and indeed at first, by corresponding acts, which challenge still more strongly the paternal development of power. The father may have made frequent use of the law to force out of the clan the sons, who have grown insubordinate to him, as rivals for power or castrate them as sexual rivals, and in this way he may have strengthened the corresponding revengeful thoughts of the son to intense longing for vengeance. This stage of the cultural development is re-

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flected, according to an idea of Freud's, in the numerous legends in which the adult sons, as in our group, are driven out by the father, or elder brother (exposure), to attain fame and wife in foreign lands. While in early cultural development, however, reality has actually demanded this sacrifice and exertion by the son, he seeks, at the same time, to indemnify himself in phantasy formation, for he forms the new home after the model of the old one, which he has lost, endows the foreign king, in whose service he enters, with the traits of his own father (family romance), the desired and captured love object with the type of the incestuous one longed for in vain. Thus, the hero of the Egyptian brother legend, who wishes to seduce the mother, is driven out by the favored rival (father, brother) (pursuit with drawn knife) or castrated (self-castration) or killed (abode in the cedar valley). The picture of the mother, however, follows him everywhere; he lives with the god-wife until she is taken from him by the king, in whom we recognize a father image. The hero follows her to the court, which represents nothing else than the wished-for return to the parental home (rendered unrecognizable), where the son can carry out in a cover picture of strange persons, the unallowed wish gratifications denied by reality. The same scheme of ruthless execution by the most prejudiced youngest son is shown by a series of legends, as well as by the majority of myths, in an original stratum, which, nevertheless, in course of the progress of culture and the consequent arrangement and subjection of the individual under the governmental forces, is overlaid by the ambivalent counter impulses of regret and piety, in the sense of the paternal relationship.[88] In

[88] Certainly there are, even though in limited degree, original phantasy formations proceeding from inhibited wish impulses of the father. Especially seem to belong here the numerous myths and legends which have for content the sexual persecution of the daughter by the father, the highly complicated wish mechanisms of which often bear witness to how hard these primitive renunciations fell on man. The scheme is, in similar manner as with the son myth, the compensation of the family: A king pursues his daughter with love proposals, she flees, and after many adventures, comes to a king, who marries her, in whom one recognizes, however, a more or less plain duplication of the father. Also in reality, the daughter, who has escaped from the sexual violence of the father by flight, is seen to occupy toward the man who receives and protects her a childlike relation of dependence.

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this stage of myth formation, there come into the foreground the ethically highly valuable, psychologically secondary, motives of paternal revenge, brotherly love, the defence of the mother or sister against troublesome assailants. So long as the heedless sexual and primitive egoistic motives can control the conscious action and thought of man, he has neither the necessity nor the ability for myth formation. The substitute gratification in phantasy formation runs parallel to the gradual renunciation of the real accomplishment of these impulses; the sometime compensations render it possible for man, progressively and successfully, to suppress certain impulses to a certain degree. The mythical narrative as it enters consciousness, is in every case no undistorted expression of primitive impulses, otherwise, they could not become conscious; on the other hand, for the same reason, they are not related of the human family, which would still be too shocking, but are imputed to superhuman beings, it may be, mysterious powerful heavenly bodies, or the gods, conceived as acting behind these, or heroes elevated to such. Thus, perhaps, may be explained the contradiction that the myths consciously represent naïve knowledge of nature, and can mediate, while purely human elements finish the form of the mythical tale, the strongly affective damming up of which affords the real instinctive force for the myth formation.

According to this viewpoint, the myth and legend formation should be considered rather as a negative of the cultural development, in a certain measure as fixations of the wish impulses which have become inapplicable in reality and unattainable gratifications which the present-day child must learn to renounce in favor of culture even though with difficulty and displeasure, as the primitive man had to in his time. This function of admission and symbolically dressed gratification of socially inapplicable instinctive impulses, the myth shares, however, with religion, with which it long formed an inseparable unit. Only the few great religious systems of humanity, in the capability for transformation and sublimation of these instincts, in the degree of disguising the gratification of these and in the ethical heights of mind thereby rendered possible, have attained a perfection, which lifts them far above the primitive myth and naïve legend, with which they hold in common the essential instinctive forces and elements.

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CHAPTER III

Theory of Religion

Religion has not always been the inseparable companion of humanity; rather, in the history of development, a prereligious stage has assumed a large place and with this stage, we must deal first in order to gain an insight into the psychical genesis of religion.

The attitude ruling men in this prereligious epoch was the animistic, that is, the primitive races peopled the world with beings to whom they ascribed life and soul as with themselves; the recognition of inanimate objects of the outer world was still lacking to them. In order to succeed in this conception, man had first to acquire the capability of sharply distinguishing between the processes of the external world and the endopsychic perceptions. So long as the division into internal and external world, ego and non-ego, had not been fully elaborated, the knowledge that the psychic reality produced by hallucinatory means is different from objective reality perceived by the senses could not become fixed. Only by degrees, does reality, not only practically, but also theoretically, compel the recognition of its independent existence, so that the necessity is provided of controlling this with real means adapted to it, and not merely as result of reflection. With progressive adaptation to reality, the previous feeling of omnipotence, based on the mingling of objective with psychic reality, had to be in large part renounced and this feeling now saved itself in the field of endopsychic gratification in the phantasy life.

Here is to be sought the starting point of all those structures which aim at guaranteeing to man in a mentally autonomous field withdrawn from reality, the pleasures which he had to sacrifice to the progress of culture. The phantasy gratification has at first no differentiated forms, gaining sharply outlined shape only gradually.

The immediate precursors of religion are totemism and taboo. It is characteristic of both that the presupposition of the exist-

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ence of a higher being does not inhere in them, but that the commands and prohibitions appear as self evident and founded in themselves. If we consider the limitations and prohibitions contained in them in their essential forms, we find that they serve the end of withdrawing the opportunity for realizing definite wishes. The assertion of these rules make evident, on one side, that one may assume the universal existence of these wishes, on the other side, that one would avoid every temptation toward power. They would assure a very important renunciation, brought about with great trouble and outlay of energy, for the good of the whole community. If the conception of psychoanalysis is correct, that the essential presupposition of culture consists in the repression of intense, pleasurably toned tendencies, which act, however, against all social development, then the material affected by the primitive prohibition must return as the deepest layer of the unconscious. As a matter of fact, one of the most important functions of totemism consisted in preventing incest and the most important case of taboo of the ruler is plainly intended to render impossible the application of force against the chief, who originally coincided with the head of the family.

As a result of this prohibition and the constantly recurring resistance against it, a psychic tension is produced, which is felt by the individual as anxiety. As a means of psychic compensation for this tension, there was formed the mechanism of projection into the outer world, whereby the conflict is settled, and the previously indefinite anxiety can be thrown on imaginary objects. This was just so much the more readily possible as the animistic view had prepared the way for the projection mechanism, so that the animate beings who arose on a basis of this view and peopled the outer world became demons, to whom one ascribed the will and the power to do harm. With the belief in demons, the first stage of religion was attained. Hand in hand with it goes the organization of magic and witchcraft as techniques which might influence the demons, partly with a view to scare them away, partly to submit to them or put them in good humor.

Thereby, the belief in demons received a new direction, in that the spirits were placed in relation to impressive processes of nature and the heavenly bodies; then began the building of mythology, while magic found its continuation in cult and rite. In all,

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however, even to the finest offshoots, the original totem and taboo views may be recognized.

The needs, on the one hand, of bringing the processes of nature nearer by incarnating them, and on the other hand, of solving the human emotional conflicts by projecting them out into nature, unite in the tendency to myth formation. The hitherto indefinitely conceived demons assume the characteristic traits of the individual phenomena of nature and are brought into relations with one another; these are copied after the human ones and at the same time represent the opposing influence of those processes of nature on one another. In this way, the demons one after another are raised to gods. Since the wishes, which are denied and later repressed, spur the phantasy to ever new results, so new figures and stories are continually attached to the same processes of nature, so long as the myth forming process is still fluid, and in this way are explained the many figures in the Pantheon of all ancient religions.

Thus, the social function of mythology is to direct the injurious repressed instincts, as far as it can, to the way of phantasy gratification and to promote the elimination of these from reality. Since, however, a part of the original gratification in reality imperiously demands its rights in accordance with the principle of the return of the repressed material from the repressing, just those institutions are utilized which had been created for the prevention of the carrying through of this. Thus, the aspirations for which the myth-forming phantasy had opened an outlet, which should protect the whole community (tribe, race, people, state) from their realization, were redirected by the other parts of religion, namely, by cult and rite. Religion is, like every product of the conflict between unconscious and repression, a compromise structure. The double phase which lies in it, that it opens the road to civilization and yet under certain conditions allows the things most hostile to the same, clings to it throughout its whole course of development. At times also, the compromise may fail entirely and religious fanaticism, which then succeeds to leadership, becomes an instrument of destruction for everything which renders possible the existence of human society.

But already in the very earliest stage, we meet this inner double phase. Before there were religious myths or ritual, the

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taboo of the rulers was utilized, not only to protect their persons, but also to torment them most profoundly by the strict ceremonial. The killing of the totem animal, which is commonly strictly forbidden, is not only permitted on certain feast days but directly enjoined as a religious duty. From this custom developed the sacrifice, as motive for which it was established that the man should cede to god what he had to give up, in order later, on festal occasions, to be allowed it as servant and representative of god.[89] Thus, the sacrifice goes back to the presupposition of identification with the godhead; quite in this sense speaks S. Reinach (Orpheus, p. 63): "Si les legendes humanisent les dieux, les rites tendent a diviniser les hommes" (If the legends humanize the gods, the rites tend to deify the men). Thus at the feasts celebrated in honor of the gods, the strictly forbidden incest could recur as holy orgy.

This recurrence of the prohibited is no simple regression, which allows the antisocial to revive again, but for its accomplishment, the way is over conditions of phantasy ideas; and if leaving the domain of the purely mental, they finally culminate in actions, then, these actions are carried out entirely with phantastic symbolic elements. For the facilitation of this compromise between phantasy and reality, the cultic performance in reference to time and place is taken from the everyday affairs and elevated above them. In this way, the encroachment on customary social relations is prevented, so that in spite of the carrying out of the unallowed, no friction with the cultural demands threatens.

All these religious practices, as compromise products, have a double face: their effect consists in the facilitation of the renunciation of the gratification of socially hostile instincts, their essence lies in their allowing, partly, merely in the myth creating phantasy, partly, by cultistic and ritualistic practice, the forbidden acts represented in this phantasy.

With the increasing demands of the repression, the limited festal manner of celebration is felt as improper and no longer permitted in undisguised form. In its place appears a series of ritualistic acts in symbolic circumlocution. Similarly, the religious ceremonial undergoes in its development from the primitive

[89] "What the man is not, but wishes to be, that he imagines himself as being in the gods" (Feuerbach).

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patterns, ever more extensive distortions, which may often attain the complete dissolution of the original meaning. Among these ceremonies, we emphasize one especially interesting group, which we meet everywhere, from the most primitive to the most highly developed relations. It is that which comprises the various purification measures for sins, and penitential acts which betray the subterranean feeling of guilt permeating all religion. This absolutely unfailing presence of the feeling of guilt shows us that the whole structure of religion is erected on a foundation of repression of instinct.

Another form of the religious act is connected with the previously mentioned magic. The magic influence consists in the circumstance that a wished-for effect is brought about by actions or words (formulæ) which have some kind of an associative connection with it, but are in no way sufficient to cause it according to the laws of nature; for example, the injury of an enemy by injuring his picture. This exalting beyond the laws of nature is the remnant of the feeling of omnipotence, which had its origin in overestimation of mental reality and which man had to renounce as far as adaptation to reality compelled. Magic has, as a presupposition, the belief that the power of the wish alone is sufficient to accomplish difficult, often impossible changes in the external world. The belief in the omnipotence of thought centers in the overvaluation of the power of speech, which is so deep rooted that it is considered sufficient to speak aloud the name of a person in order to influence him in the desired direction. This idea of the magical effect of speech is the foundation of prayer; for, with the giving up of the idea of a direct influencing by speech, there appears in its place the petition directed toward a personally conceived supernatural being, which petition betrays itself in double manner, as direct continuation of the faith in the omnipotence of the wishes. On the one hand, the petitioner expects that the solemn voicing aloud of his wishes avails to cause the god to fulfill them, on the other hand, he has at the same time indirectly preserved the feeling of omnipotence which he had to renounce by resignation to the godhead, with which he unconsciously identifies himself. The last step in the religious elaboration of prayer depreciates the significance of the word and renders mental the relation to god by placing faith in the central point and making the result of the prayer dependent on him.

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To primitive humanity, it seemed self evident, that everything which was forbidden to itself, should be permitted to the godhead or the man in the service of the same. This exceptional freedom passed as an essential attribute of god and his chosen servants, kings and priests. In this way, these were enveloped in the glory of the supernatural, especially when incestuous marriage was allowed them or indeed commanded, as, for example, with the Persian priests and Egyptian sovereigns.

With the rise from demons to god, goes a revolution in the attitude which rests on the ambivalence of instinctive forces which share in all religious formations. While, originally, only the hostility against the father and the rivalry for his superior power, as well as the wish springing from this hostility to oust him, came to expression, higher stages of development show ever more plainly the influence of love and reverence, which the son feels toward the father. For this reason, the gods are not, like the demons, merely hostile creatures, who are angry and punish, but also gracious ones who can protect and reward. In particular, since the incest barrier between mother and son had become fixed, from excessive fear of the transgression of this, not merely did the purely libidinous longings, but also the inseparably united impulses of affection, become unpermitted, as the numerous taboo prohibitions show; this circumstance limited the association of mother and son, often to extreme degree. This affection, not finding realization in the love life, now seeks gratification in the religious phantasy life and creates the figure of the maternal godhead—Istar, Isis, Rhea, Mary—at the same time lessening the austere traits of the father god. To these beloved and revered figures could now no longer be ascribed all those attributes and actions which seemed horrible to consciousness. In this direction, a secondary elaboration sets in, which gathers the individual legends into a religious system adapted to the ethical and intellectual level of the epoch. This attempt, however, is never crowned with complete success, even though it may be continued with the greatest zeal for centuries, since the instinctive components at work have the tendency to be always harking back to the gross mythology of antiquity, as is still discernible in certain Christian sects of our day.

Underlying the formation of a system, in process of time, there are also cult and ceremonial, which can thereby become so

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estranged from their origin that often scarcely a trace of their original significance is to be recognized. A series of commands and prohibitions, not suited to systematization, then drop out of the religious framework entirely and either disappear or, stripped of their religious content, live on as hygienic rules. The elaboration of a religious system carried far in regard to myth and cult, no longer takes into consideration sex, age and independent attitude of the individuals, but imposes on every believer its whole content, although the instinctive share which was especially prominent can find gratification only in a particular part of the same. As a result, the individual, even when he accepts the religious system in toto, has an especially close relationship only to certain parts which harmonize with his particular individual instinctive tendency. Thus, that one in whose own mental life the pleasure of inflicting or enduring pain plays an important rôle, will receive the Passion with much greater ardor, and revere it more devoutly, than any other piece of Christian belief. From him who has felt intensely the sexual rivalry with the father, will the figure of the Virgin Mother win especial adoration as image of the fulfillment of his own childish wishes. Thus, it becomes evident that behind the apparent uniformity which the great religious systems spread over their confessors, a personal variation has a place, which finds its expression in the more or less conscious private religion of the individual.

In the cases just mentioned, the religious phantasies serve for representing not only forbidden, but also repressed wish-impulses, which have become foreign to the individual. These can appear in consciousness only in distorted and disguised form; religion affords the socially recognized forms, by which the religious ceremonial is explained to the believer. Where, however, individual agencies crowd so strongly into the foreground that they have submitted neither to the normal repression nor to the social arrangement rendered possible by the religion, there, a more intensive form of defence begins, which represses not only the wishes, but also the distorted phantasies, and leaves to an independent existence only the ceremonial belonging thereto. That is the case of the obsessional neurosis, in which there appears the unmotivated impulse to continued repetition of certain

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ceremonies. The mechanism of the obsessional ceremonial is strikingly parallel to that of the religious ceremonial, with the exception that the obsessional acts seem absolutely meaningless to the patient and those around him, while with the acts of the religious ceremonial, the general recognition supplies the lacking real aim and sense.

The most extreme consequence of the system formation resulting from the secondary elaboration is dogmatism. This rationalizing factor inserts itself by its overgrowth between the emotional life of the individual and the religious structures created for this. The result is that, from time to time, especially gifted religious natures feel this two-sidedness, avoid the cooling circumlocution of dogma and seek anew a personal way of direct discharge. Therewith they reproduce for themselves a bit of the old past-and-gone content of religion. If such inspired ones have the further ability to act suggestively upon their contemporaries, there arises the type of founder of a religion or reformer, in whom a strong mythical quality is never lacking, as the figures of Christ, Mohammed and Luther bear witness.

Even where it does not come to the founding of a new sect, a mythical emotional stream will flow unceasingly into the religion. The fundamental idea of mysticism is the return to life of the ancient idea of identification with the godhead, which is already realized in the idea of sacrifice; in its highest and most intimate form, as immediate union of the soul with its creator. But further, in this late and highly sublimated figure, the claims of the original repressed material assert themselves, since this identification easily assumes the traits of a sexual union with the godhead; this is detected in many mystics by the analytic investigation of their confessions, even in the finest intellectual commentaries and has progressed in individuals, especially ecstatic women, even to conscious phantasies (Christ as bridegroom). In recognition of the female and passive attitude of the mystic, Ludwig Feuerbach (in the notes to Wesen des Christentums, Kröners Volksausgabe, p. 181) says of him: "He makes himself a god, with whom, in the gratification of his desire for knowledge, he immediately gratifies at the same time his sexual instinct, that is, the instinct for a personal being." The mystical ecstasy can

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increase to those forms of exaltation of which the history of religion reports numerous examples.

Thus, as previously animism in magic, so also the forms of mysticism tending to regression into the primitive, possess certain techniques for the control of the supernatural world created from the projection of the unconscious, in spiritism, occultism and such like.

In the foregoing presentation, we have sketched in the barest outlines the psychoanalytic position in the course of development of religious emotion. There remains for us an important problem which has found no place in our discussions. As mentioned, the primitive cults represent a partial breaking through of the forbidden wish-gratifications in a bit of reality extended beyond everyday life. It agrees well with the fundamental psychoanalytic principles that there meets us, as one of the most important and most frequent cultistic traditions, the incestuous union between the mother goddess and her husband-son, as in Istar and Tammuz in the Babylonian, to whom Astarte and Adonis correspond, further Isis and Osiris in regard to Horus in the Egyptian, Kybele and Attis in the Greek, Maja and Agni, Tanit and Mithra in the Indian, and finally, Izanami and Izanagi in the Japanese and many others. Also in the apocalypse of John, the queen of heaven is called the mother of the victor (12, 1), while in other places, she is celebrated as his bride (21, 9 ff.). Robertson (Evang. Myth., p. 36) directly expresses the surmise that the relation of Christ to Mary probably points to an old myth "where a Palestine god, perhaps by the name of Joshua, appears in the alternating relations of lover and son toward a mythical Mary." The practice of incest, in part undisguised, in part symbolically permitted under certain presuppositions, seems to have invested these cults with manifold mysterious halos, as we have it transmitted, for example, of the Attis cult by a notice in Clemens Alexandrinus (Protr., 2): "The son becomes the lover, which seems to have been the content of the mysteries of Attis and Kybele" (Roscher's Lexikon d. griech. u. röm. Myth.).

This temporary survival of incest in festive and mystically symbolical manner underwent, with the depreciation and elab-

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oration of the phantasy formations in course of development, various fates, of which we will here briefly follow one which has attained especial importance for the formation of religion.

The tendency to repression against incest comes into force in the myths and cults cited, to the extent that the youthful son ordinarily brought into sexual relation with the mother goddess, with the appearance of masculine maturity, immediately after this apogee of fructification, in the bloom of his years, succumbs to an early death. This sad fate is plainly shown in the traditions, as punishment for the tabooed incest, where the husband-son suffers the fate of castration, it may be from sexual rivals, it may be at his own hand, as in the story of Uranus, who, with his mother Gäa, begot the children of the world, Attis, Adonis, Osiris and others.

This tragic cutting off of the strong young god was joined to the corresponding impressive and important processes of nature, as setting of the sun and disappearance of vegetation, and thereby furnishes a motive for the psychic need for regular repetition of these cultistic acts, serving the gratification of instinct by appeal to the laws of nature. With this comparison of the individual fate with the cosmic processes, there came into account another wish impulse which dwells deep within all people, and is very important for the formation of religion and myths: namely, the tendency to deny the hard necessity of death and to avoid the recognition of it. Since this need fastens itself to the reverse of the processes of nature which are sad for men, thus, to the rising of the sun, to the recurrence of the fruitful seasons etc., there was afforded the god, sacrificed in the service of fructification, the possibility of his resurrection, which, as a matter of fact, forms an essential element in all the traditions mentioned. Here, a further phantasy comes in, at the bottom of which lies the symbolism of the earth as mother of living beings, and which, therefore, affords the individual incest phantasy a broader foundation and a new meaning. From the excised creative member of the husband-son, which the mother-wife carefully preserves (Isis, Kybele, Astarte, etc.), springs the new vegetation and thus arises to new life[40] also from the mother-

[40] Feasts, at which various peoples worshiped the phallus, were in later time drawn over to the rebirth in the future (according to Liebrecht, Zur Volkskunde, 1879).

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earth, in which the sacrificed god or his essential attribute, the phallus, is buried, the resurrected god. This resurrection is joined to the incestuous wish by means of the old and typical phantasy of dying, as a return to the mother's womb, death as a continuation of the condition before birth. Hence the sacrificed god-saviors reside, before their resurrection, in a hole, often surrounded by water, which symbolizes the mother's womb and is already applied in this sense in the birth story of these god-men. In this way, the religious phantasy, by ever-increasing elaboration of the symbolism belonging to the mother libido, creates the typical figure of the sacrificed and resurrected god-savior, under whom lies the phantasy of the incestuous rebirth from the own mother (Jung).

By the gradual recession of this incestuous significance of the mother godhead and the stronger emphasis of the wish for immortality, which ever increasingly rules the individual with the advancing knowledge of the necessity of death, there comes about the elaboration of the ideas of the future[41] which have already appeared early, to splendid phantasies which have as content the abode of the dead in an under- or overworld more or less closely related to the real world and promise man, after the lapse of a certain time, a new life on earth or a continued life in the future. Therewith is openly and expressly preserved the consolation which was originally possible to the individual only by way of unconscious identification with the god hero.

The belief in immortality and resurrection, in which most philosophically expressed religious systems center, shows, if one traces it back to the incestuous rebirth, the most complete denial of the father conceivable, whose place the son replaces. This denial is—which is shown in the feeling of guilt discernible in every religion—a result of the infantile rivalry and hostility which persist in the unconscious and from there flow out into the religious life. The later dualism of many religions, in which, besides the creator, the destroyer appears, who were originally

[41] Compare Edw. Spiess, Entwicklungsgeschichte der Vorstellungen vom Zustande nach Tode auf Grund vergl. Religionsforschung darstellt, Jena, 1877. (History of the development of the ideas of the condition after death presented on the basis of comparative investigation of religion.)

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united in one figure, is a result of the splitting of emotion which satisfies the contradictions in the unconscious attitude toward the father, when they cease to be compatible, by separate representations (separation into two or more figures, Ormuzd-Arhiman, God-Devil). The most extreme expression of the overcoming of the father is atheism, in which the individual relies entirely on himself and recognizes no creator or master.

Furthermore, the ambivalent flow of emotions, which clings to the figure of the father and feels reverence as well as gratitude toward him, as the first religious duty, never dries up. For the individual, the attitude which he has assumed toward the father in childhood remains a model of the attitude which he later assumes toward the creator of the world and the Father in Heaven. Even if he is compelled, as at the completion of the process of development, to be emancipated from the father or rebels against his authority, he can unconsciously retain the feelings of love and dependence on the father combined in his infantile attitude and bring them to expression in religion.

Therewith, the circle is closed, since religion which has proceeded from the relation of the child to its parents centers in a splendid compromise product of the ambivalent emotional impulses contained therein.

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CHAPTER IV

Ethnology and Linguistics

The facts important for the ethnological consideration can be brought to a folk-group both by physical and by psychical interaction of definite factors, as origin, religion, economic relations, climate and the like; the majority of these determinants disclose their influence simultaneously in both ways. Hence, a sharp separation is made difficult; nevertheless, the method of investigation may not be a matter of no consequence, since the physical results of every influence must be explained by biology, the psychical by psychology. To put it differently, every interesting ethnological phenomenon needs investigation in both directions, for a one-sided conception can afford no complete solution of the problem.

It is obvious that psychoanalysis comes into consideration only in the psychological part, but for this, it gains a preëminent significance. We know that very much in the views and customs of a whole people, it may be in the field of customs and manners, it may be in that of religion and morality, cannot be traced back to processes in the conscious mental life of its members. If we would keep away from the mystical conception of a "folk-soul" hovering over them, which is not derived from the summation of individual minds, we are forced to the assumption that we are dealing with unconscious impulses. These must repeat themselves in typical form in almost all individuals of a civilized society, because otherwise the readiness of the members of the whole community to submit themselves to the influences proceeding from them would be inexplicable. The greatest service of psychoanalysis consists in having helped us become acquainted with this typical unconscious mental content. When confronted by ethnological material we will ask ourselves just as in an individual psychological investigation, what bit of the unconscious may be incorporated therein and by what mechanism, it may have come to expression, during which we will never

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forget that after the conclusion of this investigation, still further information from other sides will be necessary.

The promotion of ethnology by psychoanalysis belongs in greatest part to the future; thus far, the facts that a series of community products stand in close relation to the unconscious mental life, have been utilized more in the reverse direction, that is to say, psychoanalysis has gained a valuable corroboration by finding its principles applicable in an entirely different field of knowledge and confirmed by the result of such application. In the manners and customs of various peoples there is repeated with absolute faithfulness the symbolism which had been determined in the interpretation of dreams. Thus, for example, the manifold ceremonies which accompany sowing and harvest, as well as the marriage festivities, are almost without exception only an accumulation of that symbolism by which in the dream, the acts or organs of fruitfulness and creation are represented. In this regard, the younger sister science of ethnology, the study of folk-lore, shows itself especially valuable, all the more so as it devotes itself intensively to the sexuality which ethnology has previously often passed by without noticing. The folk-lore material shows us not only the superstititions and the strange regulations which were so frequently joined to erotic activity but further than that, the influence which the more or less inhibited sexual life of a people can exercise on its other morality and thereby increases the psychoanalytic knowledge of the activity of the sexual repression on the mental life of the individual.

If the symbolism of the folk manners and that of the customs handed down from the ancestors agrees in many cases with that in which the unconscious clothes itself in dreams and related forms of expression, then we must see in that fact much more than a mere example of chance. What has been said in the first chapter concerning the essential characteristics and origin of symbolism suffices to point out to us the way to a knowledge of the regularity of this phenomenon. Symbolism is the remnant of a one time identity between the symbol and that represented, which existed in the primitive mental life; this comes to view again, therefore, where simpler mental processes come into play which are subjected to the first principle of psychic phenomena, the

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gaining of pleasure, and pay little or no attention to the compulsion of adaptation to reality. Thus, the symbols of the folk customs should, like those of the dream language, be considered as residuals of a departed age. In the dream, the analysis has verified this assumption, for its root is shown to be the regression toward the infantile, which is accomplished by the reviving of childhood memories and also by the application of infantile forms of thinking to recent impressions (daily remnants). The past age, to which the ethnological material refers, cannot belong to the individual but only to the people as a whole, and ultimately, since the boundaries between peoples disappear in the remotest past, to humanity. This comparison between individual and folk past is indeed most strikingly plain in the symbolism but by no means limited to this. A searching investigation revealed sufficient grounds to justify the supposition that the collective primitive forms of mental life, as they exist in the child, and remain preserved in the unconscious of adults, are identical within certain limits with the processes of the mental life of the savage, so far as these may hold as reflections of primitive humanity; likewise, that the further course of development, which the child passes through in order to attain the level of civilized people, can be considered as an extremely condensed repetition of the way which the whole of humanity has passed through to the civilization of the present.

We have, at the beginning, called the repression the result of the culture of the community acting on the individual. Now, we see that its counterpart, the unconscious, also stretches out beyond the bounds of the individual and represents the return of the first beginnings of our species, in which everyone must begin afresh as a child; these early conditions are withdrawn from consciousness with the progressive adaptation to civilization but never destroyed or rendered of no effect. Hidden by the superstructure of the higher mental life, the unconscious nevertheless remains alive and represents, since it comprises within itself simultaneously the past of the individual and that of the species, the universal human of the personality, the connection which binds the most highly developed, as well as those who have lagged behind, to the whole.

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This hypothesis, rendered possible by psychoanalysis, is nothing else than a transference of the socalled biogenetic principle put forward by Häckel, according to which, the individual repeats in the mental life the mode of development of the species. The question is at hand, why psychoanalysis should be indispensable to such an hypothesis since the fundamental observation of the child's mental life seems to suffice for it. To this it may be replied that the stages, most important in this respect, have already been passed through when the child has become capable of clear expression and thereby become a suitable object for study. By far the most important facts can be confirmed only by inference from the remains of that early time, which have persisted in the unconscious; that is, by the case given and tested by psychoanalysis by means of an observation of the child sharpened by this experience. Furthermore, the child's mental life is, in no way, thoroughly understood at later stages as yet, as the general error of judgment in the question of sexuality of children shows. Only with psychoanalysis has the unprejudiced observation of the child begun, since the investigator who is not familiar with his own repression is scarcely in a position to see in its true light the mental condition of the child, which is wholly or in part free from repression.

An important support for the phylogenetic hypothesis here developed lies in the fact that the parallelism in certain cases does not limit itself merely to the inner life, but also makes its appearance in external things. We refer to some of the typical symptoms of the neurotic, especially the sufferer from the obsessional neurosis, which exactly repeat the superstitious customs of primitive peoples. Both the regulations applying to the conduct of savages and the impulses underlying the symptoms were completely unintelligible, both to the persons who acted under the influence of these, and to the investigator studying them. Psychoanalysis traces both phenomena back to the same source, namely, the unconscious, under the sway of which the neurotic and the primitive man stand in far higher degree than the normal civilized man.

Thus, there corresponds, for example, to the frequently observed neurotic fear of clear ringing sounds, pointed objects

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and the like, a taboo command which forbids the keeping of weapons in inhabited places; the obsessional idea that the death of a man could be caused by his own evil wishes, is repeated in the belief in the possibility of injuring an enemy by magical formulæ; the joy-destroying grief of the neurotic for a beloved person finds expression[42] in the anxiety of the savage lest the departed return as hostile demons; as the relations of the neurotic to the persons important to him vary between immeasurable love and immeasurable hate, so also the savage has an ambivalent attitude toward certain persons who are especially important for him, in particular toward his ruler and those of different family, so that there is exhibited toward them, now, the most devoted reverence, now, the most pitiless hostility; especially, however, do the countless strict regulations which would prevent an undisturbed dwelling together of the family members of opposite sexes—mother and son, mother-in-law and son-in-law, brother and sister—make plain that there exists in the savage, the exaggerated anxiety over incest so important for the etiology of the neurosis, which is to be explained only by a most intense temptation to incest.

Thus the complexes which disturb the family life of the neurotic also play a rôle in the primitive family, which fact is important from the standpoint of the history of civilization.

The parallel between psychic onto- and phylo-genesis is more than an interesting observation; in numerous cases it can be demonstrated that what psychoanalysis has shown to be the important factor of the individual development has also been of great importance for the cultural development, and therefore, if intelligently applied, can contribute to the solution of the most difficult ethnological problems. Of course, progress must be made cautiously and the diversity of the material given proper consideration. The greatest part of the development of humanity was occasioned from within outward, by the masses of energy gained from mental sources, somewhat like the establishment of the taboo-prohibition with its ethical, religious and esthetic results, together with the structures which were created as compensation for the renunciation imposed by this prohibi-

[42] "Every dead person is a vampire, the unloved ones excepted." Friedrich Hebbel, Diary of Jan. 31, 1831.

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tion. But this development, is extraordinarily strongly influenced by external circumstances, now hastened, now retarded, many times even directed into entirely different courses. The agencies determining the manner in which the external world exerts its influence are often fundamentally different, both in individual development and manner of development. Thus, for example, the creation of fire has been a most highly important act not only for the physical conditions of existence but also, indirectly, for the psychic conditions. We may assume—and the traces of memory preserved in ethnology also prove it—that this activity, eminently important for the primitive man, was suitable to set free in him great quantities of affects and resulted in corresponding displacements of his libido toward the outer world. After this new kind of discharge of affect had firmly established itself on the basis of the great practical advantage connected with it, the mental economy could be placed on a new basis. Likewise, the introduction of agriculture brought with itself a mental revolution. The right to plough up mother earth and fertilize her, brought about the downfall of countless taboo prohibitions which narrowed life, a proof that alongside and by means of this progress in external culture humanity knew how to gain a bit of internal freedom which had previously been withheld. The knowledge of the creation of fire and the practice of agriculture can scarcely exercise on the mental life of our children a similar revolutionary influence, hence these activities have significance for our unconscious only in their sexual symbolism which may represent a final remnant of their one-time phylogenetic value.

These circumstances which disturb the parallelism are to be taken into close consideration in the application of the psychoanalytic method and results to ethnology; whoever attempts, without giving them proper consideration, to make a smooth transference from the one series to the other, will be unable to make his accounts agree. It would be very unjust to blame psychoanalysis for this, or turning the tables, to assert that this or that fundamental principle of psychoanalysis was incorrect because it could not be applied immediately to the early history of humanity. For psychoanalysis, the investigations begun in

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this field are of extraordinary value as a test of its validity and as substantiation of the much disputed theses enunciated by it. Its real conclusive force rests first and last on the individual psychological material in which it may never be contradicted. If its applicability in other sciences is thereby rendered difficult, still this is to be considered a necessary consequence of the different manner of arranging the material which demands a special method. An "Open Sesame" by which, without care or pains, all doors are opened, psychoanalysis is not.

In close connection with the above deductions, stands the question, whether one has to so conceive of phylogenetic parallelism that, as a result of a law still unknown to us, all the stages of mental development of the race are contained in the individual, from the beginning, as dispositions, from which dispositions, with the progress of organic development, as one might say automatically, the stages of mental development make their appearance, or whether, only for the reason that the same causes are working on the child as on primitive humanity—passage from pleasure to reality principle, animistic view of the world, incest limitations, etc.—the same results are brought about. It is evident that the answer to this question, which can be given with any certainty, only after the investigation of the whole problem has progressed quite far, cannot be demanded at the beginning of the inquiry. In any case, the first possibility, which goes still further and includes a series of other problems within itself, must for the present be laid aside as a working hypothesis.

The traces of earlier mental life are preserved for us in another structure which exists in uninterrupted flow from the earliest times to our own day, and is of the highest, yes, most decisive value, for the mental life of humanity, namely, speech. Concerning the development of speech in the child, thus far, no investigation from the standpoint of psychoanalysis has been instituted. On the other hand, with reference to the great problem of the origin of human speech, the philologist, Dr. Hans Sperber[48] has proposed an hypothesis which, without proceeding from psychoanalytic premises, completely agrees with the

[48] Imago, Part 5, 1912. "Über den Einfluss sexueller Momente auf Entstehung u. Entwicklung der Sprache" (concerning the influence of sexual agencies in the origin and development of speech).

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results of the psychoanalytic mode of thought. According to Sperber, for the discovery of the origin of speech, it is necessary to find those typical situations which earliest brought home to man the desire to influence another person in the direction of his wishes by voluntary sounds. Of such situations, there are only two: the child who lacks nourishment, and the sexually excited man; these two persons will perceive that the cries emitted by them, at first in purely reflex manner, call to them a person, whose presence they wish, and will learn from that, to repeat these cries intentionally when they want the person in question near them. From the case of the child, who calls his mother, no way leads to speech formation; easily, however, from the sexual call. The first activities of primitive man are really substitutes for the sexual act for him, hence, he will utter the same call, for example, in lighting a fire, and when he has once learned the efficacy of this, he will invite to participation in this latter activity by it. Later, the same sequence of sounds is used in general, only in the derivative sense, since the younger generation learns to use them before the reproductive instinct awakens in it. Then, if after the lapse of centuries, there came the discovery of a new activity, as digging or hammering, another sexual call which had become fixed in the meantime now passed over to the new discovery. Thus is explained the origin of many primitive verb-roots, with which the beginning of speech is filled. In reference to the substantives, it may only be pointed out in brief that the most important division which we make to-day, namely, according to gender, indicates how much in all things the relations to the sexual characteristics were considered.[44]

It agrees exceedingly well with Sperber's hypothesis that in most languages the roots for the names of the primitive forms of activity: to light a fire, to dig, to plough, etc., have the secondary meaning, to practice coitus. Since speech formation can be only so conceived that some few primitive forms (roots) assume a series of meanings and in the course of time become varied by

[44] Erich Schmidt calls astonishing the instinct of children of nature for sexual distinctions, which is extended beyond man and animals, to sensual personification of all phenomena (Schlesinger, Geschichte des Symbols, p. 417).

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addition of cultural forms, it may be considered as proven that those roots which were best adapted to the change in meaning were the most suitable for speech formation and these are, as we have seen, the sexual. Roots with originally non-sexual significance, which appear in later stages, will gain a great capability for extension from the fact that they have passed through the sexual sphere of ideas.

From a stem with the meaning vulva we find, for example, derivatives which serve to denote such slightly related ideas as baker's ware, ragged piece of clothing, vessel and others. Thus, middle high German "Kotze" for vulva, also means prostitute, and finally, coarse woolen goods, kötze, pack-basket. To this category belong Alsatian "Kutt," the posteriors, Bavarian "Kutz," intestines, Thuringian "Kuttel," sack (from which "Kutte," a piece of clothing of shape of sack), English "cod" cushion (Old Danish kodde) and the "Kutt" found in many German dialects, ditch. With this list, the derivatives are not by any means exhausted: Swiss "chutz," owl, then "Kotz," tuft of flowers, Swedish "Kotte," the round spike of flowers of the pine tree, Old High German "chutti," agmen, Dutch "kudde," grex. In addition, a large number of these words have also kept the old meaning of vulva.

If the importance of a group of ideas for the speech formation depends on the fact that derivatives from the expressions taken therefrom may easily come into use in other, very numerous and most widely separated fields, then theoretically, we are justified in saying that this field is sexuality. The universal tendency to obtain a secondary gain of pleasure in every action directed toward a practical end, can be presupposed. This would be best brought about in every case when it succeeded in finding for such an activity a similarity with an activity not directed toward practical ends, but only toward pleasurable gratification; if this result was attained, it would be retained and constantly emphasized anew, so that to the unpleasant practical activity would be fastened the name of another pleasant one, and thus sanction the substitution of the one for the other by name. Of such kind of pleasurably toned activities, there are only two for primitive men, namely the satisfying of the hunger and the

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sexual instincts; while the satisfaction of the hunger instinct is an act which is carried out in a most simple and stereotyped manner, and scarcely affords the ground for numerous analogies, and which, in the beginning, completely lacked the social characteristic, the case with the sexual instinct is far more favorable. Another very important circumstance is the fact that to the hunger instinct which is served only by immediate real gratification, the world of phantasy stands immensely farther away than to the sexual instinct. Finally, the deeper reason for the preference of this latter lies in the repression which meets it the very first thing, adding a dynamic agency which is completely lacking to the hunger instinct. Since man, as a result of the erection of incest barriers and other cultural demands, had to renounce in great part the previously customary sexual gratification, there became disposable in him a considerable quantity of libido for which he no longer found use. The feeling of discomfort which arose from this damming back of libido caused him to utilize every opportunity for releasing it, that is, he sexualized his surrounding world and especially his own activities. While, thus, the creation of an analogy with the satisfaction of the hunger instinct, aside from its greater difficulty, afforded merely a positive premium of pleasure, the sexualization could act still more beneficently by lessening the discomfort from tension.

The complete counterpart of this original manner of development may be observed in higher stages of civilization and with more intensive repression. When the frank designation of sexual matters begins to act as causing shame and therefore discomfort, a substitution is interposed in its place, for example, instead of the word for vagina, one for the mouth or another harmless bodily opening, or for the reproductive act, some kind of work. This comparative method of designation often acquires in time by constant application for the same purpose the sexual meaning itself. Thus, by this process, words which were originally harmless, are changed into sexual ones, while the primitive development consists in an expression, customarily used for sexual things, expanding by change of meaning to the name for a culturally important business or implement. By the

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changing power of attraction and repulsion of sexuality, a part of the development of speech is kept in constant flux.

Also, aside from the relations to sexuality, the knowledge of the unconscious is of highest value for the comprehension of the origin and earliest development of speech, because therein are preserved those primitive forms of thinking which took part in the first attempts at speech formation. In the internal connection which exists between thought and speech, an hypothesis can scarcely be proposed concerning its genesis, if no definite idea has been formed of the manner of thought of primitive men, which was always very different from that of the present.

The influence of some mental mechanisms belonging to the unconscious may be asserted to-day, although we stand only at the beginning of the investigations dealing with it. Thus, there belongs to the previously mentioned attributes of the unconscious the peculiarity that the feeling for the incompatibility of opposites starts from it; indeed that it delights to link these together, even when they are diametrically opposed. Many decades ago, this same peculiarity was maintained by an eminent philologist[45] as a constant peculiarity of the oldest languages; these languages designate many contrasting pairs by the same expression, which only later divides into two different words with contrasting meanings. Thus, the word "taboo," used many times by us, and the Hebrew word of same meaning, "kodausch," as well as the Latin, "sacer," have the simultaneous meanings of "sacred" and "uncanny," "accursed."

The capability for abstract and conceptual thinking developed only slowly and was certainly present in the early stages of the development of speech only in rudimentary form. To the question, with what forms of thought the primitive men may have worked, where the terms were lacking to them, analogy with the unconscious likewise affords us a conclusion. The unconscious is also unfamiliar with the formulation of a concept, hence it utilizes to wide extent another more obvious means, in order to establish mentally, at least in some measure, the peculiarity and connection of things, namely, symbolism. Thus, two ideas widely separated in our thought may be very closely joined in the unconscious mental life, and in that of primitive people, by the

[45] Karl Abel, Über den Gegensinn der Urworte, Leipsic, 1884.

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fact that both are used as symbol for the same represented object, or that one of the two corresponded to the represented object itself, the other to the representing symbol.[46] This possibility, etymology, in investigating the oldest derivatives, should constantly take into consideration. Numerous symbols are universally familiar from their application in folklore and art. Etymology already makes use of these and psychoanalysis need only call attention to their especial significance in the unconscious mental life as a hitherto unknown factor. Other symbols, and just those which are most characteristic of the primitive mental life, lost their relations to conscious comprehension and disappeared almost completely from those forms of symbolic application which are calculated for reception by another one. They withdrew to those kinds of expression of the unconscious which are glad to escape comprehension, as is the case especially in the dream. The symbols of this group may, in general, only be comprehended by deep investigation of the unconscious, and hence, for the etymological estimation of them, a knowledge of psychoanalysis is an indispensable condition.

We must cast a hasty glance over the material of speech, the sound formation. For the child, the joining together of articulated sounds, which it little by little learns to control, is something independent, which the child prefers to distinguish from the things denoted, since he may much easier subject these sounds to his own will than the things themselves. The child is, therefore, inclined to misunderstand the connection between a thing and its name, which it cannot quite grasp intellectually, so that he takes the name for the thing, regarding it as a substitute for the thing itself. Something similar we find among primitive men, who are of the opinion that one has a certain power over a thing if one knows its name. On this rests the inclination to euphemism, namely, among names of people and names of places; numerous remains of this belief occur in myths and legends.

It is a result of this error that in childish and also in primitive thought the assumption prevails that to the similarity of name a material connection must also correspond. The clang association, in this stage of mentality, easily takes the place of

[46] According to Gerber (Die Sprache der Kunst, 1885) the roots were created in the stage of unconscious symbolism.

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the actual relation; also, in the unconscious, the same is the case; This is very plain in the dream work, which delights in deriving connections from clang associations, with disregard of the connection in content. For the origin of speech, the tendency, which appears in dreams, of bringing into connection the similarity of the thing with the similarity of the sound of the name, is of preëminent importance.[47]

An analogy to this mechanism is afforded us by the origin of writing. Of the Egyptian hieroglyphics, we at least know definitely that the gradual transformation from a consecutive series of pictures to a sound writing took its origin from the circumstance that one applied definite signs, not only for the objects which they represented, but also for other objects with which they possessed absolutely no internal or external relationship, except that the names of these had the same or similar wording. Thus, they utilized not the basis of the material association but that of the clang association. For example, son is represented by the picture of the goose, because both words sound somewhat alike; judge, one writes as wolf, because both bore the name "seb."[48] The interpretation of Horapollon, who sought to represent, at any cost, relations of content as the underlying ones, led to the same nonsense as would result from a dream interpretation which should make use of the same technique.

Obviously, psychoanalysis comes into consideration only for the origin of language and etymology. In this, there is no overlooking of the importance of the higher development and still less depreciation of philology devoted to its study. From the standpoint of our consideration, nevertheless, these stages come

[47] "Between the word and its object comes the picture and, by chance, signifies like-sounding objects between which no other connection than a phonetic and sound symbolism exists. Where different words agree in sound, they deceive the people, so that it assumes a like relation. This belief in the relationship of sounds and their double meaning has a share in the formation of the Greek religion." Welcker (Griech. Götterlehre, 1857).

[48] Die Hierglyphen, by Prof. Dr. A. Ermann, Sammlung Göschen, No. 608. According to Conrady, this naming by means of the "sound rebus" was also the rule in other related picture writings, like the Chinese and Sumerian (Veröffentlichungen des städt. Museums für Völkerkunde in Leipsig, 1907, Pt. 1, Introduction).

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into consideration only as secondary elaboration of the primitive mental material, for our task is limited to explaining the influence of the unconscious on speech formation in the fundamental characteristics and calling attention to how much is to be gained for the science of language by the attainment of a better insight into this problem.

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CHAPTER V

Esthetics and Psychology of the Artist

The possibility of a psychological understanding is always easier in poetry than in any other field of art. We would, therefore, keep this constantly in mind with our esthetic considerations and only occasionally touch upon other kinds of art.

If we propose two fundamental esthetic questions, namely, what kind of enjoyment a work of the art of poetry affords, and in what way it accomplishes this, the first deliberation shows contradictions, which can scarcely be solved so long as the consideration remains limited to the processes of consciousness. For to the first question, we must answer that the content of poems is in great part suited to arouse in us painful affects: calamity and sorrow, the suffering and downfall of noble men are, for tragedy, the only themes, for the epic, the romance, the novel, the most frequent ones; also, where cheerfulness should be awakened, that is only possible when misunderstandings or accidents bring the persons for awhile into difficult and unpleasant situations. But we find the acme of the pleasure from art, where a work almost takes our breath away, and causes the hair to stand on end from fear, so as finally to call forth tears of deepest suffering and sympathy. All these are feelings from which we flee in life and strangely enough seek in art. The effects of these affects are plainly of quite a different character when they proceed from a work of art than otherwise, although they are received by consciousness as the same; hence, this esthetic alteration of the affective effect, from painful to pleasurable, is a problem in which we may expect assistance from the knowledge of the unconscious mental life.

This changed relationship in our affects can in no way be explained by the mere fact that the observer or auditor knows that not reality but only make-believe stands before him. In this way, we may understand why facts which would affect us painfully if they were true, happening in this make-believe world,

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make us cheerful, as was mentioned for comedy and related forms; in the most essential cases however, we are dealing with something quite different. The normal effects of these facts on our feelings are not altered by this failure of reality; rather, they excite exactly the same affects, as fear, terror, horror, sympathy, etc., and are thus, at least at the moment of their activity, received entirely in earnest and placed on a par with the real ones. It is the affects themselves, which are differentiated from those aroused by reality, not in the cause of their origin, nor in the form of their expression, but rather by the sign of pleasure, inverted to its opposite, which is inappropriate to the content.

With this explanation comes the answer to the second question. The chief means by which the poetic art achieves its effect is the peculiar condition into which the listener is transposed. As by suggestion, he is compelled to experience things which are related to him of another, that is, to transpose them into subjective reality, in doing which, however, he never completely loses the knowledge of the correct relation of things. The degree of deception which may be attained is different in every kind of art and conforms to the suggestive means which are employed. These means are, in part, determined from within by the material, in part, are technical aids, which have developed in time to typical forms and represent the inheritance from earlier generations which lie ready for the creating artist. On the other hand, those arrangements, in which the illusion may be attained by direct imitation of reality, like those in use on the modern stage, do not belong here, because they have nothing to do with the essence of poetic art. With the two others, we will deal later.

We dwell next upon the peculiar middle position, in which everyone is transposed, on whom a work of poetic art exercises the full and correct effect. He will feel the truth of this work, know its falsehood, without this continual alternation, which ought to arouse the most painful indecision, troubling him in the least. When we draw the comparison with other phantasy products, especially with the dream, which is often placed parallel to poetry, we find that in the latter the deception is complete. Aside from an exceptional case with special basis (the feeling of dream within a dream), the dreamer believes, even to the end, in the reality of the processes. That the insane patient puts his de-

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lusional structures in place of reality is well known. But when we keep in mind the immediate precursors of poetry, the myths, we find the same phenomenon. Man of the myth-forming ages, which are still by no means entirely past on our earth, believes in his pictures of phantasy, and may occasionally regard them as objects of the external world. That the poetic art is no longer able to do the same completely for us indicates a lowering of its function, to which its lessened hold within our social status corresponds; that it is partially effctive makes it the last and strongest comforter of humanity, which finds the entrance to the old buried sources of pleasure becoming ever more difficult.

The phantasy formation, to which the poetic work in this, as in many other respects, stands nearest, is the so-called day-dream, to which practically all people occasionally yield; especially before and during puberty does it assume a large place and keen significance in the inner life. The day-dreamer can gain from these phantasies a considerable amount of pleasure without believing in the real existence of the dreamed situations. Other characteristic marks separate these products sharply from the work of art: the day-dream is without form or rule, it knows no aid, which, as we have seen, the work of art uses to attain its suggestive effect, and can easily get along without this, since it is not calculated for effect on others, but is purely egocentric. Therefore, we may find again in the day-dream the inversion of the affective effect, which seems so puzzling to us in the work of art, but of course not in the same amount. Mostly, situations which are pleasant to the dreamer, fulfilling his conscious wishes, form the content of the day-dream; especially, such things as the gratification of ambition by immense success, as marshal of the army, statesman or artist, then the attainment of the object of his love, the satisfaction of his vengeance for the injury done him by one more powerful than himself, does the day-dreamer paint in all their fulness. Among these appear also, though less often, situations which in reality would have been highly painful; these, however, the day-dreamer carries out and repeats with the same pleasure. The most frequent type is the phantasy of his own death and also of other suffering and misfortune: poverty, sickness, imprisonment and disgrace are often represented; not less often, also, the idea of the perpetration of infamous crime and the discovery of the same.

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We will not be surprised to find that the average man, as day-dreamer, finds the same enjoyment in the production of such phantasies as the hearer of a poem in its reception. Both functions are in essential aspects identical, in so far as the reception of a phantasy consists only in the fact that it is experienced. The presupposition for the possibility of this circumstance, is, of course, that there be present in those receiving it the same tendencies, for the gratification of which the phantasy was created. The first requisite for a work of art that is destined to exert influence beyond the limitations of time and space, is therefore its universal human foundation. Now, among the similar fundamental instinctive tendencies of humanity, the day-dream can scarcely lack such a basis entirely; the distinction lies in the fact that the common human traits, by which a sympathetic feeling for another is possible, appear in the phantasy of the artist without his interference and assume the guidance, while with the day-dreamer they are hidden by his most personal considerations in life. Thus, we see, to give an example, in the day-dream of the ambitious person, a man whose immense success would extort no interest from us, since the dream is satisfied with the fact and disdains every internal introduction of motive, by which the case would be included in the universal psychic (material). In "Macbeth," we see also an ambitious person and his success but the premises are followed even to the roots of each ambition, so that everyone who has fostered ambitious wishes, must, irresistibly transported, feel the whole horror of the night of murder.

Herein we perceive a hint toward the understanding of the suggestive power of the work of art, but to the problem of the inversion of the affective effect, we have not yet approached any nearer. To that problem, we can only find the solution, when we accept the help of the affect theory of psychoanalysis. This teaches that a very great amount of affect may remain unconscious, indeed, in certain cases must remain unconscious, without the pleasant or unpleasant effect of these affects, which necessarily belong to consciousness, being lost. The pleasure and discomfort so existing in consciousness is then attached to other affects, namely, to those belonging to the same ideas; many a time this union succeeds so completely that nothing striking remains; very often, however, the pleasure or discomfort is inadequate for

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the affect—complex from which it seems to arise, or, as in our case, it is opposed. The pathological examples of immensely strong expressions of joy or grief on apparently insignificant occasions are well known. The foundation of the thing is, of course, more complicated than it has thus far been represented. Without further explanation, it is not correct to say that the pleasure set free by the unconscious affects is annexed to favorite representatives. This would contradict the strong determination in mental affairs and produce the erroneous presupposition that an affect, excluded from consciousness, would renounce its success. Rather, those ideas and affects which are capable of being conscious, which now work with so strong gain of pleasure and discomfort, are nothing else than the servants and substitute formations of the original, but now repressed, affects. Between these two, a close associative connection must be demonstrable and on the path prepared by this association, the pleasure shifts and the fund of energy belonging to it also.

If this theory is correct, then its application to our problem must be possible, and would have to run something like this: By the work of art there are aroused, besides the conscious affects, also unconscious ones, of much greater intensity and often of opposite pleasure phase. The ideas by the help of which this happens must be so chosen that they possess, besides the connections present before the testing consciousness, also sufficient associations with the typical unconscious constellations of affect. In order to be chosen for this complicated task, the work of art must be so constituted that it will perform in its origin for the mental life of the artist, what it performs at its reproduction for the hearer, namely, the discharge and gratification by phantasy of the unconscious wishes common to both.

It must be remembered here, what was said in the first chapter concerning resistance and censor, and the necessity of disguises (distortion) connected with these. The undisguised presentation of the unconscious would call forth the whole defence of the social, moral and esthetic personality, thus arouse, not pleasure but anxiety, disgust and horror. Poetry, therefore, makes the most extensive use of all those masks and means of representation—transposition of motive, inversion to the opposite, weakening of the connection, splitting of a figure into several,

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duplication of processes, condensation of material and especially of symbolism. Thus, there arises from the repressed wish-phantasies, which, being typical, must necessarily remain limited to a few, and the oftener repeated, so much the more uniform, the endless, never to be exhausted variety of the work of art. This variety is assured by the individual variation and also by the varying intensity of the repression which with the change of cultural epochs, directs its strongest resistance now against one, now against some other bit of the unconscious.

The conflict between repression and unconscious finds in the work of art, as in a compromise formation, a temporary accommodation. The unconscious succeeds in breaking through without the necessity for a direct attack upon the barriers of the censor, which are rather circumvented in clever manner. To be sure, the conflict is not removed from the world by this circumvention, that is shown by the frequent inverted signs of pleasure, with which the phantasies appear before consciousness. Even in the disguise, a painful characteristic adheres to the longed-for situations which marks them as ghosts, rising from the haunts of the unconscious. To make this trait, able to raise the enjoyment of art, is now woven into the work of art, while the conscious connection is so united that the chief situations readily assume the character of sad, fearful, forbidden; especially in tragedy is this regularly the case, and in it, further, the purification of the soul of the hearer is most completely attained. That most works of poetic art awaken sorrowful affects in our consciousness is thus no contradiction to their pleasure-giving function, as we might think at first, but a confirmation of it; for on the one hand, the unpleasant affects in consciousness are employed and placed in the service of the artistic form, on the other hand, the forbidden pleasure, nourished from unconscious sources, is enjoyed under the mask of the foreign affect without offending the censor.[49]

The capability to create pleasure from painful affects and the emphasis of poetry on the ideas belonging to these affects, which

[49] "I have often said and will never recede from it: the representation kills that which is represented, first in the representor himself, who brings under his feet in this way what had hitherto made him act, then furthermore for those who enjoy it."—Friedrich Hebbel.

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is rendered possible in this way, must, however, have still a second root, for the day-dream, which is unable to place the unconscious in the service of the artistic tension, utilizes it likewise, even though less often than the work of art. As a matter of fact, a primary gain of pleasure may be derived from these phantasies of suffering. We know already that there belongs to the infantile instinctive tendencies which may not be quite eliminated in the sexual activity of the adult, also the sexual pleasure of inflicting and enduring pain (sadism-masochism). In the day-dream, where the gratification of these infantile tendencies is connected neither with physical pain nor with evil social results, they also find after complete repression their foster home and from there, wander over into the work of art where they are received and utilized for its secondary tendencies.

It is an important factor, also, that the esthetic enjoyment occurs entirely aside from the acting and achieving ego situated in reality. Thereby it is made possible for the hearer to identify himself with any feeling or with any figure without hesitation and to always give up this incorporation again without trouble. In this sense, the command "L'art pour l'art" has its full justification, since the work of art with a purpose, by which the author and his public constitute themselves, à priori, in favor of certain opinions and figures, so that for their opponents there remains only refusal, may not bring all sides of the mental life into play. In such cases, a remnant of the relation to reality remains missing which clips the wings of the phantasy. Only he who loses himself completely in a work of art can feel its deepest affect and for this end, complete turning away from present aims is necessary.

There still remains for us, the consideration of the means of the esthetic effect, which we have divided above into internal and individual on one side, and external and technical, on the other. To the first category, belongs, preëminently, the basic principle of economy in the distribution of affect. In order to call forth a stronger impression with the work of art than would be possible in an actual occurrence or in a day-dream, a structure is necessary which does not allow the affect to flatten out immediately, and uselessly, but raises it slowly and regularly from one stage to the

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next, until the highest degree is attained, and the affect is then abreacted as quickly as possible. The "internal form of art," which compels the artist to choose a different kind of treatment for each material, is nothing else than the unconscious insight into how the maximum amount of affect, which may be produced by the object, would be attained by the proper alternation between progress and retardation. According to this insight, the artist will then treat the material as tragedy, epic, novel or ballad, and further, adapt the means to the variety exactly according to the aim. The economy of affect is just that mark of genius, by the aid of which the latter produces the strongest effects, while against its rules the most beautiful declamation and the most brilliant acting produce no deep impression.

Besides the economy of affect, there stands, in second place, the economy of thought, in favor of which, in the work of art, everything which happens must be given a motive, according to strict rules and without gaps, while real life, with its gay and tumultuous instincts, leaves in our hands, only here and there, the tattered shreds of a motive. In the poem, the thread of action can never break unaided, the course of events within the work is completely visible and according to the principle of sufficient reason for understanding without addition, that is, our laws of thought must not assert themselves painfully against the outer world, but find a world before them, which is harmoniously constructed according to their rules. The result of this is that the connections of the work of art are understood without effort, without the trains of thought and the facts crossing each other; the economy of thought is the cause of the phenomenon that, for the reception of the work of art, immensely less expenditure of energy is necessary than for the reception of a bit of the outer world of same extent; the result of this saving of strength is a gain in pleasure. By the assistance which the economy of thought still further affords, for example, by means of the introduction of a consequent parallelism or the arrangement, side by side, of sharp contrasts in motives, processes and figures, this gain of pleasure can be increased.

It may now be seen that at this point the narrower esthetic problems begin which can in great part be brought nearer to

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solution by the application of these fundamental principles to definite groups and families. Into these problems we may not go and, therefore, turn to the external means of art; these consist, since speech is the medium of poetry, in clang effects which we can divide into two groups: rhythm and rhyme.

Rhyme has existed in various forms as alliteration, initial rhyme, internal rhyme, etc., until it has become fixed for our circle of culture as end rhyme. The foundations of the pleasurable effect are common to all; the repetition of the same syllable causes a saving of attention and this just at the time when the rhyming word is both times essential for the sense, and no mere expletive; the exertion of force, for which one must be prepared and which suddenly becomes superfluous, is transformed into pleasure by the repeated recognition of the same thing. On the other hand, the play with words, whereby the real importance is apportioned to the sound and on which the associative connection is built, is a source of childish pleasure which is thus reawakened by the rhyme for the domain of art.

Rhythm was already known and used in primitive stages of culture as a means of facilitating labor; this function it has retained and it serves where the overcoming of real resistances remains outside of consideration, besides our case, for example, also in the dance and children's play for direct gaining of pleasure or increase of pleasure. Still it is to be added that the most important forms of sexual activity, especially the "pleasure sucking" of the child, then further of the sexual act itself are rhythmical from physiological reasons. By the introduction of rhythm during a definite action, the same is thus rendered similar to the sexual processes, sexualized. Hence the pleasure in rhythm has probably, outside of the motive of economy of work, also an equally important sexual root.

What is said here of the work of art is founded on the investigation which Freud has instituted in the problem of wit. Wit, too, serves the unpunished gratification of unconscious tendencies. In order to win favor with the listener for its content, wit, too, can utilize the childish pleasure in rhyme, which is occasionally carried to the extreme of apparent nonsense of words. All those kinds of aids, such as in poetry, the artistic form demanded by

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economy of affect and of thought, then rhyme and rhythm, serve as forepleasure. That is, they afford the hearer a premium of easily attained pleasure and thus entice from him his first interest. By means of a chain of such pleasure premiums, a psychic tension is produced and gradually strengthened that causes the listener to perform the exertions which the reception of the work demand of his power of imagination, to overcome his resistances until the endpleasure in which the discharge of the affects and the relief of the tension is attained. To the superficial observer, the whole sum of pleasure which a work of art awakens seems to be created by the means which serve to call forth the forepleasure; but in reality, they form only the façade, behind which the real pleasure arising from the unconscious is hidden.

The mechanism of the "forepleasure" is not limited to these two cases. We have already made its acquaintance in following the course of development of sexuality; there we saw the previously independent partial instincts afford the forepleasure which spurs on to the attainment of the endpleasure (in sexual act). In addition, a similar arrangement may be shown in still other fields.

The relationship with sexuality is not limited merely to external affairs; it is a common saying that the question "whether Hans will get his Gretel" is the chief theme of poetry, which is ever declaimed anew in countless variants, without the poet and public ever getting tired. That not only the material but also the creative force in art is preponderatingly sexual has been expressed more than once in intuitive knowledge. Psychoanalysis must limit this view by substituting for the plainly sexual, the instinctive forces of the unconscious. If, in the unconscious also, the by far greatest significance falls on sexuality, still, it does not entirely fill out the same; on the other side, it should never be left out of consideration that the sexual springs, which psychoanalysis recognizes, must have a quite particular characteristic, namely, that of the unconscious. The conscious desire is not long satisfied with phantasy, it destroys the make-believe and strives toward gratification in reality; upon the appearance of the latter, both the pleasure in creating of the artist, and the esthetic enjoyment of the audience, is removed and brought to

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naught. The unconscious desire does not distinguish between phantasy and reality, it estimates the events not according to whether they are objective facts or only subjective ideas, and to this peculiarity, it owes its ability to form the psychological basis for the structure of art. Especially is this true of the Œdipus complex, from the sublimated instinctive force of which the masterpieces of all times and peoples have been created; the traces of this fact are afforded by the more or less disguised representations of the Œdipus situation, which the analyst can always trace back again to the primitive type. Now, as in Œdipus himself, the deed is carried out in all grossness; now, again, inverted, the forbidden desire is consciously striven for, but expiated by the fact that the relationship turns out to be false (family romance); most frequently, the situation is weakened so that instead of the mother the stepmother, the wife of the ruler or another figure who betrays herself as the mother image only in the finer details enters and the figure of the hostile father undergoes a similar distortion.

If we extend our observation to the art of painting, we easily find certain related traits. As a root of the inclination for painting may be assumed, for example, the sublimation of the looking instinct (Schautrieb), especially strongly developed in the instinctive life of the individual. The pleasure from looking (Schaulust), in its most primitive form in the child, is joined to the first objects of pleasure, among which, the sexual, in the broader sense of psychoanalysis, assumes the first place. It is known that the representation of men, especially of the naked human body, long passed as the only task of the painter and sculptor. The landscape, enlivened by no figure, first appeared, only in more recent times, after a further increase of repression had sharpened the demands of the censor for a diversion from the original goal. Still it holds even to-day that the human body is the real and noblest subject which no painter may entirely neglect. The original fundamental interest which is repressed by civilized man may still be plainly recognized in the sublimated form.

The place of the economy of thought is taken in the art of painting by the economy of vision. The ideal is to show the

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spectator every phenomenon, free from confusing accidental peculiarities, in the form which is essential and most characteristic for the artistic effect, as it presents itself to the soul of the artist, thereby sparing the observer the trouble of separating that which is important for the impression from that nonessential.

Still plainer than in the general foundations of the artistic creation is the connection with the unconscious in the production of the individual work. The fact that the conception of a work of art and the condition of mental elevation connected with it does not proceed from consciousness has been testified to by all, without exception, who were in a position to have experience on this point. The inspiration is a sudden comprehension of figures and connections, which were either entirely unknown to the artist himself until this moment or wavered before his mind in hazy indefinite form and now arranged themselves before him at a stroke, in vivid clearness. The mysterious part of this process has led to the assumption that the artist owed it to a heavenly inspiration which he cannot have created from his consciousness. Psychology has now for a long time been unable to dispense with an un- or sub-conscious in explanation, without, however, hitherto occupying itself with the nature of this force distant from consciousness, and submitting to itself the question whether the products of inspiration may not be determined by this force, so that one might learn from the investigation of their mutual characteristics something concerning the mental acts taking place beyond consciousness.

The question, whence the artist gets the psychic material previously unknown to him, is not hard for psychoanalysis to answer. It is otherwise, of course, with the problem of the cause, by which the transition from conscious to unconscious is put into the work and the mechanism by which this transition is brought about. The fact that we are dealing with a flight from reality and with a regression to infantile sources of pleasure is the only fixed one. How the mode of utilization of this method differs from that which the neurotic prefers, for which exactly the same formula holds, is still little investigated. The question is just so much the more interesting, because the traits of both types very often mix, since the same man can be artist and

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neurotic at the same time, thus caring for a part of his regressively gained pleasure by the medium of artistic inspiration and another part by means of neurotic symptoms. According to what fundamental principles the choice is made, whether, perhaps, the union of certain instincts with certain others is needed in order to become adapted for the one or the other method, on all these points later investigation must enlighten us.

A fundamental distinction was already outlined in the first chapter. The neurosis makes it impossible for the associates of the patient to attribute a meaning to it. The symptoms produce the impression of arbitrariness and nonsense and are, furthermore, certainly not suited to be felt by the relatives of the patient as pleasant or to bind strangers to him. The malady troubles and hinders the social relations of the neurotic. With the artist, the condition is essentially different. Indeed, the talent for art renders difficult the adaptation to the surroundings; the examples of this, that artists as husbands and fathers, friends or citizens do not come up to the mark, need not be gone into in detail. It belongs to the fate of the artist that, right at the point, where he should act immediately through his personality, he mostly remains without results or is not understood; still, he knows how to give a form to his works which finds, not only understanding, but calls forth deep pleasurable effects. Thus, by the fact that he withdraws himself to his infantile attitude, the neurotic loses his social connection, even though against his will, while the artist knows how to win back that which, for the same reasons, he must give up, in a new way, which is only passable for him. He sues for love and admiration, not in the ordinary manner, but in a more complicated and more spiritual manner, he captures the others in the indirect way by the depths of his own personality. For the rest, enough exists in common to form the psychological foundation for the often observed similarity between the artists on the one side, and the nervous and mental invalids, on the other, genius and insanity.

The tendency to sudden changes of mood, the immoderation in love and hate and the incapacity for steady following of practical ends, may be explained by the strengthened influence of the unconscious on the conscious and voluntary conduct of life.

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The constantly renewed upward pressure of primitive mental forces, which, if they succeeded in getting conrol, would burst asunder and desecrate all the bonds imposed by culture, creates a deep, lasting feeling of guilt, which transposes itself by "rationalization" into moral over-refinement; this latter occasionally changes again, with the consequent overstepping of ethical barriers. In general, uncompensated mental opposites are better endured in consciousness than by the average man, in whom likewise an assimilation to the unconscious mental life is to be seen, which does not stir up against each other the opposing pairs, but allows them to exist side by side.

To both types is common the high irritability or sensitiveness to irritation; that is, they often react to very slight external stimuli with apparently an immeasurable and incomprehensible amount of affect. The cause of this characteristic lies in the fact that the possibility of a reaction from unconscious sources of affect is easily given as a result of an accidental disturbance of the association chains leading thither.

The relation of the artist to the outer world is peculiar throughout, because the latter comes into consideration for him, not so much as playground for his passions, as instigation for his creative phantasy. For this, a very small amount of external experience suffices. Very often, the manner of work of the genius has caused wonder, that he should show in his works the closest knowledge of the human soul, in all its fulness and depth, before he could extend his observations beyond the smallest circle. The explanation lies in the fact that the human soul is infinitely greater than the circle which presents itself to consciousness. In the unconscious, lies buried the whole past of our race; it resembles a navel-string which binds the individual to the race. The greater the valuable part of the unconscious is, just so many more possibilities exist for the genius, divesting himself of his conscious ego, to change into strange personalities. If Shakespeare saw, even to the bottom of the souls of wise men and fools, saints and criminals, he was not only unconscious of all this—which applies perhaps to everyone—but he possessed also, the other gift which we lack, of making his unconscious visible, while he allowed it to create apparently independent figures from his

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phantasy. These figures are all merely the poet's own unconscious, which he has put out, "projected," in order to free himself from it.

The artist can experience more in very small events than the average man in the gayest adventures, because they are only the occasion for him to become acquainted with his inner kingdom. His irritability is only the reverse side of the phenomenon and must appear, so far as he does not utilize this overflow for his work but chooses the everyday way of allowing his affects to discharge in reality.

Finally, if we attempt to gain from the previous considerations a standpoint for the recognition of the importance of art in cultural development, then, we come to the conclusion that the artists belong to the leaders of humanity in the struggle for the taming and ennobling of the instincts hostile to culture. When one of the customary forms of expression becomes obsolete, that is, remains below the cultural level and stands in the way of ascent with its all too treacherous figure, then it is the individuals gifted with artistic creative force who make it possible for their fellow men to free themselves from the injurious instinct, without being compelled to renounce the pleasure, at the same time casting the old instinct in a new, unobjectionable, nobler form and putting this in the place of the old. Inversely, if the repression becomes superfluous in one place in its previous intensity, then the artists first feel the lessening of the pressure which bore heaviest on their spirits and utilizing the newly won freedom for art before it has yet come to pass in life, point out the way to their contemporaries.

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CHAPTER VI

Philosophy, Ethics, Law

As philosophy has a quite special relation to the other sciences, so the psychoanalytic method of consideration occupies a special position toward philosophy. The disciplines previously treated, permit the analyst to fall back upon the object of these and disclose in them in the more or less phantastic, unconscious share of scarcely-to-be-denied wish material, the entrance to the understanding of the phenomena and therewith the enrichment of the fields of knowledge in question. The philosophical systems, on the contrary, meet us in the shape of material knowledge, with the claim to be judged as purely scientific and final explanations of the position of man in the outer world and in the universe.

If this separation of philosophy seems, at first, to preclude every psychoanalytic entrance, still, two other prominent peculiarities in the consideration of the philosophical system and its creators afford us an occasion for approaching the problem of philosophy and the philosopher. It must strike everyone at once that in philosophy, the personality of its creator appears in a measure that does not really exist in a science, and also, in no other field of knowledge except art. This circumstance induces us to elucidate from the standpoint of psychoanalysis the peculiar psychological structure of the philosopher, which raises him above the pure scientist and brings him nearer the type of the artist, yet still sharply differentiates him from the latter. With this elucidation is given us also a comprehension of an essential part of the system formation which is influenced, to a perceptible degree, by individual attributes of the personality, indeed, is often determined by purely subjective agencies. The following of this individual set of conditions of the system, as far as the instinctive life and the fate of the libido, on the one side, and the exposure of its inner relations to character, personality and life influences, on the other, forms the task of a psychographic investigation as it is

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beginning to develop from the application of psychoanalytic principles and viewpoints to the life and work of gifted minds.

This method of investigation opens to us what one might call an inner door to the depths of personality, in the wish material underlying the system; a series of philosophic systems affords the psychoanalytic investigation a broad field of attack upon the systems themselves, in which the unconscious of their creators, which invests them with much of general validity, either as metaphysical projection into a transcendental world, or as mystical expression of endopsychic perception, or finally, directly in what you might call metapsychological knowledge, appears as object of philosophical consideration. We would now discuss briefly and methodically these different possibilities of an application of psychoanalytic viewpoints to the field of philosophy, beginning with the psychographic consideration of the philosophical personality, of which, we may, selecting the extreme forms, distinguish three chief types:

1. The type of intuitive spectator, the real artistic metaphysician, as represented most truly by Plato and as plainly delineated in the Mystics and the closely related speculative natural philosophers;

2. The type of synthetic investigator, such as the systems of positivism of Comte, Spencer and even, in a certain degree, the empirical theory of Locke, presuppose;

3. Finally the type of analytic thinker, as represented in sharpest outlines by Kant and Spinoza and also by Descartes, Hume and others.

These types are naturally, as our artificial arrangement of the systems among them shows, seldom to be encountered in pure form in individual cases, but still possess temporary value in the far more frequent mixed forms of these various traits shown in individual philosophers.

The type of analytic thinker who proceeds preëminently from the certainty of the theory of knowledge which seeks to erect the foundations and bounds of conscious human knowledge will scarcely afford in his theories an object for psychoanalytic investigation. The mingling of unconscious wish elements is, in far-reaching measure, excluded, since consciousness works in the self-knowledge of its own capabilities. With this type our interest

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is concentrated on the peculiar character formation and personality which comes to expression therein, so that the philosopher, as shown in many places, seeks to shut himself from the practical and genial life, to keep himself free from the deceptive mingling of reality in his thought processes, as far as he may, in order to bring thought reality into play in extensive manner.

The psychoanalytic study of the obsessional neurotic has afforded a first understanding of these philosophical tendencies, as well as the relation to world and men, action and thinking, resulting from them, that is, to the limitation of action and overgrowth of thought. These patients are not only closely related to the type of the philosopher by their own keen intelligence, their interest in transcendental things and their ethical scruples, but also betray to us further the narcissistic nature of self-examination of their own thinking and the intensive sexualization of this, which tends ever farther away from the original sensual content of the ideas, to the pleasurable emphasizing of the thought processes themselves. To the neurotic compulsion to subtle inquiry, to the pathological search for explanation, to the force-destroying doubt of the obsessional neurotic individual, there corresponds the philosophical admiration of otherwise unobserved phenomena, the logically motivated pedantic arrangement of thought according to the principle of symmetry, the strong need for causality that unites itself preferably to the deepest, insoluble problems of individual and cosmic design, which are enveloped in eternal doubt. All these traits reveal themselves to the psychoanalytic investigation as the result of various fates of definite infantile instinctive tendencies and inclinations, among which the pleasure in looking (Schaulust) and the craving for knowledge, as well as the instinct for mastery, connected with cruel impulses, play the chief rôles. In particular does the early and energetic repression, which the intensive sexual investigation of the child experiences from external and internal agencies, come into play in corresponding manifold ways. Either the desire for knowledge of the forbidden object of investigation is so well repressed that it remains inhibited from then on; or the repression of sexual curiosity fails and returns from the unconscious, as neurotic compulsion to constant questioning, in which, now, the thinking and investigating itself assumes the pleasure which originally applied to the sexual aim;

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finally, there is still possible, the ideal case, that the libido sublimated to the desire for knowledge supports and stimulates the instinct for investigation, so that it is possible for the latter to work in the service of intellectual interests.

We easily recognize that the type of analytic thinker stands nearest to the second possible outcome of the repression of infantile instinct for investigation, in that he, remaining in a purely intellectual field, invests the thought processes themselves, by means of a far-reaching introversion of libido, with pleasure, and forces upon reality the laws of his own thought, as happens in the subjective realism of Kant,[50] Schopenhauer,[51] and others, and further, in the phenomenalism ending in Solipsism. The egocentric attitude toward the outer world, reveals itself, as the result of a narcissistic overvaluation of the ego[52] and thought reality, which is projected into the outer world.

Opposed to this, stands the type of positivistic investigator, who applies his sublimated need for knowledge and causality in suitable manner to objective reality and therewith, has, for the most part, renounced the pleasure principle. As is obvious, he represents the third of the cited potential results of infantile repression of instinct, and will afford the psychoanalytic investigation in his personality and his work, the least material, since with him, libidinous instinctive forces, as in Nietzsche, functionate only as a thought creating motor.

By far our greatest interest belongs to the first type of true metaphysical philosopher, who is most accessible psychoanalytically, not only in his artistic personality, but often also betrays so plainly in the content of his work the phantastic wish material that the relationship of this kind of philosophizing to the invention of myths struck even Aristotle. Thus, while the two first types

[50] Kant: "Hitherto, one assumed that all our knowledge must direct itself toward objects; . . . One may therefore make the attempt once, whether we may not get along better in the problems of metaphysics by assuming that objects must direct themselves according to our knowledge."

[51] Schopenhauer: "The world is my idea."

[52] It is known that Fichte places most distinctly the ego and its consideration in the center of his philosophy and view of the world and derives everything else from that. The metaphysical distinction between pure and empirical ego does not come into the question for our psychological consideration.

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possess preëminent characterological interest for us, since the unconscious instinctive impulses and libidinous energies serve only in the byway of character formation, as generator of thought and investigation, still, in the third type, the content of the system is plainly determined and influenced by the unconscious; to this fact, the few typical fundamental views and systems, ever recurring in the course of the development of philosophy, would have called our attention; the many surprising similarities in structure and content between these philosophical systems and the miscarried system formations of certain sufferers from mental disease, psychoanalysis has disclosed.

Though this kind of philosophizing is closely related to artistic endeavor, still, it is not to be overlooked, that both these types of mental productivity display a sharp differentiation, indeed, in certain respects, a psychoanalytically interesting contrast. Even outwardly, the artist is scarcely conceivable without a strong attachment and need for courting his contemporaries, while a strong introversion of his libido and an autistic thinking (Bleuler) characterize the philosopher.[53] The banal conception of the erotic freedom of the artist and of the sexual continence (chastity) of the philosopher, denotes this contrast even if grossly, still, not without significance.[54] The artist ever joins his universal human creations to the individual case, the philosopher strives for generalizations; the artist wishes to please and, therefore, uses suggestive means, the philosopher wishes to convince and therefore makes use of logical means. A distinction extending beyond the description, Schopenhauer has fixed in the statement: "One is not a poet without a certain bias for error and falsehood; on the other hand, not a philosopher, without a directly opposite propensity." The deeper differences may, in the ultimate analysis, be traced back to a difference of sexual constitution, that by the artist, an hypererotic, that by the philosopher, an anerotic, matured on variously emphasized partial instincts and the manifold fates of these, but especially in the philosopher, on a much farther forced diversion from sexual into mental, transcendental, unreal.

[53] Plato also calls thinking "sublimated sexual instinct."

[54] Both Schopenhauer and Nietzsche emphasize the typical unmarried condition of the philosopher, which they themselves demonstrate in the examples of Cartesius, Leibniz, Malebranche, Spinoza, Kant and others.

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The unconscious expresses itself in corresponding manner in these system-formations as in the artistic productions. We distinguish accordingly two forms of expression of the same in the philosopher which are characterized as metaphysical, since they seem to be founded on no objective knowledge: namely, the religious and mythological system-formation. The former, of which there are various forms, postulates a creator, who may have produced the world from himself or from nothing (Heraclitus, Stoics, Neo-Platonists, Mystics). As in the formation of religion, psychoanalysis recognizes also in this, the universal unconscious projection of a father image, which has been powerful in infantile life, and can assert, that the feeling of omnipotence ruling the "thinker" here seems to pass over to the god-father by way of projection. In other systems, the whole world is animated in animistic manner and the dualism of the dead physical world and of the spirit permeating it, is contemplated under the picture of sexual reproduction; the rich elaboration of this sexual symbolism by individual mystics plainly betrays this system as projection of inner libido processes. In conscious recognition of this sexualization, not only of the thought functions, but also of the thought content, Ludwig Feuerbach once traced back the philosophical contrasts and speculative discussion of the relation of subject and object, to the sexual relation of man and woman.

The mystical system-formations are characterized by the assumption of a transcendental world, which, like the subjective idealism, can pass as depreciation, refusal, or destruction of painful reality and as a flight to the infantile wish-situations projected from the unconscious. Here belongs also the belief in preëxistence, transmigration of souls and return of the same, which, in ultimate analysis, proceeds like the corresponding religious dogmas, from unconscious mother-womb and rebirth phantasies.

These metaphysical ideas are, in their disregard of every test of reality, most readily accessible to psychoanalytic dissection, as phantasy products, and reveal themselves then, as phenomena of projection of the unconscious mental life into a supernatural world which naturally approaches the wishes of the individual in question, and those of many others in high degree, since psychologically considered, it represents only a narcissistic self-reflection of the individual in the cosmos. This metaphysical projection forms

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in a way, the most primitive and most frequent form, in which the unconscious flows into system formation. The first step in the direction of knowledge of the unconscious is formed by the rationalistic and mystical systems which, however opposed they may appear otherwise, still have in common that they expect to find the deepest nature of the world and the ultimate knowledge of things; in spite of this tendency, they cannot gain a direct insight into the field of the unconscious but conceive only in endopsychic perception and represent in symbols. In this stage of knowledge, the unconscious meets us in the philosophical theories as something mystical, inconceivable and unrecognizable. In the course of further development, there has finally come about a sharp, definite conception of the unconscious, of which individual philosophers, as for example Hartmann, speak, even though in a different sense than psychoanalysis, while others have recognized and represented it in its significance and operation, as Schopenhauer, in the theory of will, or Nietzsche, whose psychoanalytic derivation of the metaphysical and ethical needs from primitive instinctive impulses, needs only to be recalled here.

In order to forestall misunderstandings, we will state expressly, although in this connection, the exclusive emphasis of psychoanalysis needs no apology, that, with these schematic remarks, we have neither exhausted the essence of philosophy, nor glanced over the history of its development, nor believe to have made entirely comprehensible the personality of the philosopher. All we could expect was to hastily indicate from what points the psychoanalytic method of consideration was in a position to approach these problems. Searching detailed investigations will have to show how much such attempts may be able to contribute to the psychological comprehension of philosophy.[55] To a critical estimation of a system, they will naturally never extend, and do not pretend to; they may only give definite hints and suggestions concerning the personal and subjective conditions of philosophical thought and views, whereby, however, the objective value of philosophical results must not be touched in the least.

Similar viewpoints and limitations, as for our study of metaphysics, apply also to the psychoanalytic elucidation of ethics, as

[55] Compare the works of Dr. Phil. Alfr. Frh. v. Winterstein and Dr. Eduard Hitschmann in "Imago," II, 1913, Part 2, April.

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far as it is treated in the systems as a philosophical discipline. This comes about mostly from the claim that philosophy, on the ground of its insight into world phenomena and human life, is also first called upon to state ethical standards for the conduct of the individual in his relation to society. Here we have to overlook entirely this tendency, which goes back to the rationalistic conception of Socrates of the instruction of youth, and to consider psychologically the ethical theories of the individual philosophers primarily as the expression of individual needs and demands. Such a study teaches that the history of ethical development within philosophy represents a reflection of the repression of the gross, egoistic, violent and cruel impulses of man and that the struggle against these asocial impulses takes place in the field of ethics, as the struggle against the libidinous impulses does in the domain of metaphysics. Thus, for the special elaboration of ethics, the fate of the predominating infantile instinctive impulses of cruelty and pleasure in mastery will be important, which depend on their mingling with libidinous components (sadism). The establishment of ethical standards comes about by repression of these impulses by means of reaction formation, from which formations result the demands of pity, human love and like esteem of fellow men. That opposing asocial impulses originally underlie these ethical postulates is plainly shown in the ethical revolutionaries appearing from time to time, who ridicule the coddling morality of pity, and prize as remedy the unscrupulous devotion to crass egoism, the will to power, like Stirner and Nietzsche. But even so profound a follower of ethics as Schopenhauer cannot do enough in the detailed description of evil, cruel and jealous instinctive impulses; it is even reported by Spinoza that he, under pretense of scientific aims, tormented insects most cruelly; the most pretentious ethicist among the philosophers, Kant, began his philosophical career with an article "concerning radical evil in human nature."

Thus, the history of ethics shows the unceasing alternation between the pressure of the reaction-formations against the egoistic instincts and the tendency to carry these through, regardless of everything; both kinds of attitude are conditioned by particular instinctive tendencies of the individual and the more or less successful repression of definite groups of instincts. A similar rela-

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tion exists also in the demand, enunciated in many ethical systems, for complete or partial renunciation of sexual intercourse and the numerous limitations of sexual pleasure (sexual ethics).[56] Youth is thus nothing less than teachable, everyone is rather necessarily "ethical" so far as his repression suffices for the erection and maintenance of reaction formations, and the demands of individual philosophers can first have significance and application, only for themselves and a number of similarly endowed individuals. That, under such circumstances, the eminently important problem of apparent freedom of the will, in the sense of a psychoanalytic view of the world, needs a revision, may be merely mentioned here.

If we would attempt to gain from our viewpoint an insight into the genesis of ethics, we must proceed from the fact that its essence exists in the renunciation of a gratification in pleasure which the individual voluntarily imposes upon himself. That far, the old taboo prohibitions are the direct forerunners of the ethical standards. Of course, the motivation is quite different in the two cases. For, the limitations by the taboo go back, as far as a conscious motive was formed for it, to an entirely egoistic basis, the anxiety before an evil threatening the transgressor. The unconscious grounds, on the contrary, are the social considerations in those institutions, especially the primitive family, the existence of which would be threatened by the temptation which the taboo would forestall. The temptation itself became repressed and, at the same time, the correct motivation connected with it must have become inaccessible to consciousness. Since the welfare of the individual is closely united to that of the race, the social grounds go back again in great part to the egoistic. For the other part, however, libidinous desires participate, which invest the renunciation in mental life with permanency, by rendering it pleasant, at least in indirect ways. Such motivations, proceeding from the libido, and mostly probably secondary, are for example, the experience of greater gain in pleasure by deferring the gratification or the love to a person whose claims and emotions may be spared by the renunciation.

In contrast to this, in the ethical position, egoism may play

[56] Compare Christian v. Ehrenfels: "Sexualethik" (Grenzfragen, No. 56, Wiesbaden, 1908).

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absolutely no further rôle as motive, except as anxiety before punishment. It is suppressed; in the most extreme case of the "saint," it is even repressed from consciousness like the asocial wishes with the taboo. The social motivation, on the contrary, which, to-day, where the family no longer coincides with the state and humanity, has become colorless and unobjectionable, is now placed in the foreground and published as the only and sufficient one. Concerning the sources of this social duty, two chief opinions have been advanced in science, of which one represented by Rousseau seeks a voluntaristic determination in the "original goodness of human nature," while the other, intellectualistic, centers in the categorical imperative of Kant. To the unconscious motivation of ethics, as reaction formation against repressed instincts, attention has already been called. The chief tendency of the taboo barrier was to make physically impossible, the forbidden (action) by cutting off every opportunity, while the method of action of ethics consists in mental energies trying to draw the will to their side.

Farthest removed from the sphere of direct influence of the unconscious seems to stand law, since it grants to gratification in pleasure the smallest place and represents most strictly the material and logical conformity to the end in view, thus, adaptation to reality. Law, in its pure form, renounces entirely the demands on the community of emotional interest, its formula is not the "you should" of ethics but the matter of fact "if you do this and do not do that, a definite injury will be done you by the community or a definite advantage withheld," wherein it leaves out of practical consideration for the individual to decide. In this, the statutes stand nearer to the taboo than does ethics, only the taboo threatens an indefinite evil from indefinite source. If this didn't happen, then probably the punishment was decreed by the community and thus the transition from taboo prohibition to law was effected.

We leave entirely out of consideration the civil law, and would devote a short consideration only to the criminal law, which, because of its saturation with ethical and religious views, stands nearer to the unconscious mental life. This relationship makes its appearance also outwardly by the manifold symbolism with which legal decisions and execution of punishment were

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adorned among all peoples.[57] Even in our time, which puts aside the symbolism that is otherwise unsuitable for practical ends, a bit of this symbolic dress has remained in the criminal process. The significance of this symbolism has been happily investigated by J. Storfer[58] in a case of punishment of parricide in ancient Rome. He succeeded in showing that the symbolism has been the expression of the universal unconscious assumption, that the motive for the murder of a father (the basic case of parricide), is always the striving for the sole possession of the mother. Of such an hypothetical form of the participation of the unconscious in punishment, we may naturally speak, only in figurative sense. In truth, the case must be that every individual unconsciously transfers himself into the mental situation of the criminal, identifies himself with the latter. The crime, which the community punishes, was thus unconsciously committed by each of its members. The punishment gives the community welcome opportunity to do the otherwise forbidden cruelty under a social sanction. The predilection with which on such occasion the same was meted out to the criminal as he had done and the unconscious of the others had wished (jus talionis), is to be considered as final real execution of the wish awakened by the crime.

The criminal who committed these acts which the others have already renounced thus represents a lower stage of control of instincts, viewed from the standpoint of present day culture, a phenomenon of regression to more primitive epochs. The anthropological similarity between the criminal and the savage, emphasized by Lombroso, has a psychological parallel in the neurotic, who fails in the social order from failure of repression of instinct, though in different manner.

Criminal psychology has hitherto made little use of the insight of psychoanalysis.[59] One way, which allows the recognition of a connection with the unconscious, was indicated by

[57] Max Schlesinger, Die Geschichte des Symbols, Berlin, 1912, Book III, Chap. 2, as well as other literature there noted (page 267 ff.).

[58] J. Storfer, Zur Sonderstellung des Vatermordes, Vienna and Leipsic, 1911.

[59] In this connection, compare Erich Wulffen, Der Sexualverbrecher, Berlin, 1909.

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the association experiment. The method chosen in that is the one elaborated by the Swiss school of psychoanalysis (Jung and others), in which it had been demonstrated that the feelings and experiences of the subject of the experiment could frequently be brought to light by his reactions to a series of selected stimulus words. Since for the criminal his act belongs to the strongly emotionally toned complexes, the attempt was made to determine the condition of facts and convict the presumptive criminal.[60]

We have previously spoken of crime, as a phenomenon of regression, and must now also consider the question under what conditions a deed could be so estimated. Also in this regard, the previously mentioned work of Storfer affords valuable explanation. In this early stage of social development, in the epoch of patriarchies, murder of the father was synonymous with high treason; since the primitive kind of expiation otherwise practiced, the blood revenge, was impossible in this case—not within the family because the son, by the success of his deed, would have become chief of his sex and not from family to family, because no injury to a strange fellow man was present—the endeavor to protect the life of the most important member of the community became the first occasion for the establishment of culpability for an act, from the viewpoint of public law. Therefore, murder of a father is to be considered as the archetype of crime.

In primitive relations, the motive of such a deed is to be sought in the economic rivalry between father and son. As a matter of fact, there exists among many people the institution of setting aside the father by the son who has attained power. Amidst the family property, the wife stands in first rank and the exclusive right of the father to all the women of the family has left behind its traces in the jus primæ noctis of the patriarchal commonwealth. The parallels with what psychoanalysis has found in the unconscious mental life of the individual may thus be shown in the origin and development of the criminal law.

[60] C. G. Jung, Die psycholog. Diagnose des Tatbestandes, Juristisch-psychiatrische Grenzfragen, IV, 2, Marhold, Halle, 1906.

A. Stöhr, Psychologie der Aussage, Das Recht, Sammlung v. Abhandlungen f. Juristen und Laien, Vol. IX/X, Berlin, 1912.

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CHAPTER VII

Pedagogy and Characterology

Psychoanalysis is not merely a science which represents an essential enrichment of our knowledge of human mental life; rather, it was first elaborated as a practical method of treatment for influencing mental disturbances.

The essence of the therapeutic technique consists in freeing the patient from the obsessional control of certain instinctive impulses, unbearable to his ego, but insufficiently repressed, which develop their preponderating effect from the unconscious, while the unsuitable process of repression automatically proceeding from the pleasure-pain principle is annulled in the analysis and replaced by the conscious control of these impulses, corresponding to the adaptation to reality.

The means of this influencing are, according to the nature of the malady, less of an intellectual than of an affective kind, and are aided by the patient's desire for health, as well as his intellectual interest in the analysis. By the associations of the patient, his dreams, symptomatic acts, mistakes, and other expressions, avenues to his unconscious are created and gradually broadened, during which, the intensity of the original repression meets the physician as resistance against the disclosure of the unconscious. The overcoming of this resistance is the chief task of the treatment. It succeeds only with the help of a dynamic factor, on the correct grasping of which, the possibility and outcome of the treatment depend. It is this, the influence of the physician, which becomes possible on the basis of a definite affective attitude of the patient which we call transference, because it corresponds to a sum of affect of sympathy or antipathy transposed to the person of the physician, which had once been applied to important and authoritative persons of childhood (parents, relatives, nurses, teachers, priests). In the employment of the suggestive factor, psychoanalysis differs from all other psychotherapeutic methods in the fact that it remains con-

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tinually conscious of the peculiar nature of its activity and utilizes the pliant faith of the patient to accomplish lasting changes in his mental life, which guarantees him, after the necessary dissolution of the transference relation, his mental capability and independence.

The effect of the psychoanalytic influence comes from two factors: the freeing of the repressed instinctive impulses from the false symptom-forming attitude and the new and suitable adaptation of these impulses to the real possibilities of gratification, that is, the directing into socially valuable paths of activity (sublimation), which arrangements had failed in an earlier stage of development. The psychoanalytic therapy is thus to be compared to a "late reëducation in the conquering of the remnants of childhood" (Freud) and as such has a claim on pedagogic esteem.

Of course, the therapy developed for adult and melancholy individuals is not suited without change to be transferred to direct application to the healthy growing child. The nature of the psychoanalytic task, and its solution, brought along with it the circumstance that, at first, it throws light only on what one might call the negative side of the educational problem, since it teaches us what influences are to be kept from the child in order to protect it from the later ruin in the neurosis, the downfall of all educational results.

The foundation for the prosecution of the positive pedagogic task must be an understanding sexual education, particularly sexual enlightenment. This should not result from, as so often happens, gross seduction, brusque initiation or accidental overhearing of sexual acts (especially of the parents). Rather, all these injurious influences are to be kept away, but on the other side, every forcing away from healthy sexual knowledge, especially every kind of mysteriousness in sexual matters is to be avoided. So far as possible, one should leave the child alone, with as complete withholding of direct injurious influences as possible, and inhibit him as little as possible in his natural development. The child takes the sexual affairs of which he receives knowledge from the processes of his own sharp sighted observation of the bits of nature around him at first like other

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facts of experience and so must the adult learn to accept them, if he will be a helpful counselor to the child. A real explanation would first have to be given, as soon as the child himself, by spontaneous questions, betrays an intense interest in the meaning of sexual processes, which, because of his limited experience, can be only partially or not at all comprehensible.

The growing boy, who is interested in the question Whence come Children? has a right, if not to complete at least to undistorted information, the withholding or falsification of which, may be severely avenged later. But further, an immediately fateful result may come about in the child, who, as a rule, is informed to some extent before the question is asked, if he feels himself lied to and deceived by his parents. Not seldom, he loses all reverence and trust for adults and becomes accessible with difficulty to influence from the educator.

For, already in the child there arises that portentous transference relation of libidinous impulses toward the persons of his nearest surroundings, which was recognized both in the psychoanalytic treatment and in the normal education, as the most important lever of suggestive influence. As the child stands in relation to the parents, especially the father, so will he arrange his attitude toward the respective persons later representing this authority (teacher, priest, superior, chief, etc.) and, therefore, the most important condition of all later educational work remains the formation and preservation of good relations in the family, which, at present, unfortunately, are only the exception and not the rule. On the other side, these relations should not become too intimate, since otherwise, the capability for transference, sublimation and separation of the parent libido, may be rendered difficult and even limited to neurotic fixation. The smooth separation from the authority of the parents and the personalities representing them, is one of the most important but also most difficult performances which is incumbent upon the child at the close of his educational work, if he is to attain mental and social independence. Here, pedagogy has much to learn from the transference relation and its gradual dissolution in the psychoanalytic treatment.

Psychoanalysis allows, however, not only the exhibition and

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avoidance of errors of education hitherto committed but may also lead to the attainment of better results of a positive nature. The psychoanalytic study of the neuroses has illuminated, from the dynamic side, the problem of character formation and development which had previously remained in almost total darkness. Of course, it can say nothing concerning heredity influencing the character of the man, which goes beyond the scanty and uncertain results of the theory of heredity, but knows ever so much more of the process of its growth, which is decisively determined by external and internal processes of the individual life. Character can be conceived as an especially clear mode of reaction of the individual, taking place in typical manner; the analytic investigation has now shown that in its formation a far smaller share falls to the intellectual agencies than one had hitherto been inclined to believe. Rather, the character structure rests on an economy of mental interplay of forces suitable for the individual, which sometimes demands a quite definite distribution of masses of affect, a certain amount of gratification, suppression and sublimation of instinct. The remaining character traits of a man are either unchanged continuations of the original instinctive impulses, diversions of the same to higher aims, or reaction formations against the same. Thus can a child, perhaps originally cruel, who gratifies himself sadistically by tormenting animals, later become a butcher or ardent devotee of hunting and thereby continue the old satisfaction and gratification of instinct in little modified, though socially more useful manner; he may, however, choose a profession which allows him this in the service of higher, more intellectual and more scientific interests and perhaps, as naturalist, carry on vivisection with especial interest or as surgeon perform valuable service to science and his fellow men; in a third case, the all too powerful instinctive impulse may fall under intensive repression and seek gratification by way of reaction formation in humanitarian and ethical activities, which are opposed to the original instinctive aims, thus, the cruel sadistic child becomes in later life outwardly sympathetic and devotes himself with special predilection possibly to protection of animals. Finally, there are possible by the strengthening of original instinctive tendencies dur-

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ing the course of development and deficient formation of inhibitions, the antisocial outcomes in perversion (sadism) and crime (cut-throat), as on the other side, an overintense repression can lead to unfortunate outcome in the asocial neurosis (obsessional).

Other attributes of character show less simple relations to the component instincts underlying them or the endeavors springing from these; many are not simple in their origin, since individual components of instinct can undergo various fates; on the other hand, many partial instincts may have interacted for the ultimate formation of a character trait, strengthening, paralyzing, limiting one another. Still, psychoanalytic analysis of instinct has shown that our best virtues, many of our most valuable mental achievements and social institutions owe their origin to the transformation of instincts which were originally evil, low and asocial.

Also for the child's later choice of a vocation and the so frequent fateful mistakes therein, the psychoanalytic method of consideration gives the educator certain points of vantage which are worthy of attention, even though often enough, in individual cases, external factors resisting influence inexorably demand their rights. In general, the individual will come nearest to the ideal of education, of being subjectively most happy and at the same time most efficiently fulfilling his profession in the service of society where he is permitted to utilize the infantile sources of instinctive activity in a sublimated and for society more useful form, like that in the above mentioned case of the surgeon.

Besides the dynamic conception, a further piece of psychoanalytic comprehension of character formation rests on the insight, that just the component instincts of sexuality, which are unsuitable in normal social and love life, are earliest capable of such modifications and improvements, so that it is, therefore, the task of education to take the expressions of these asocial and "perverse" instincts in the child, not as occasion for their sharpest violent suppression, but as indications of the proper time and place for a favorable influencing of the instinctive tendency. In particular, there are in early childhood, pleasurable sensation, connected with the excretory functions (anal and urethral eroticism) which undergo the most intensive repression with present-day

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civilized people, and afford by reaction formations against these "animal" interests, essential contributions to the formation of character. The relation of man toward his animal functions (to which sexuality is also reckoned) and the kind of his mental reaction structures to these, are not only characteristic in general for individuals but seem also, to establish essential racial differences and inclinations.

For the educator, there results from psychoanalytic experience, the demand to keep more sharply in mind, besides the intellectual components of character formation, especially the affective agencies of transference, further the dynamic ones of the sexual instinctive share and its fate, and by consciously directed guidance, to make these useful. In this sense, psychoanalysis must first become an educational method for healthy adults, as it is already for adult patients, with whom the healthy have in common the bit of amnesia for the important processes of childhood, which renders difficult and prevents the understanding of the mental life of the child. It will be the task of a psychoanalytic propaganda to educate the educator to self knowledge, to mutual freedom and candor, which are demanded for intimate dealing with children and for their favorable influencing.

Throughout, psychoanalysis warns against imposing on the child too severe demands for repression, emphasizing rather, more careful consideration of the individual capabilities which, of course, should be raised to a certain common cultural level. In general, it cannot be so much the task of education to create new repressions in violent manner, as rather to observe carefully, and support appropriately, in its appearance and progress, the tendencies to repression, which has already begun spontaneously on the basis of internal processes and the general influence of civilization; in particular, to see that this repression is not demanded in exaggerated intensity, thus turning the instinct into false and injurious channels. Psychoanalysis recommends striving for control of instinct in place of suppression of instinct, the aiding by certain premiums of pleasure the child in the renunciation of momentary gratification in pleasure in favor of a later more valuable one adapted to the demands of reality; these premiums, however, should not consist in customary manner of

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material things (playthings, candy, money, etc.) but in ideal values. The child is only to be educated by love, and under this condition, will feel sufficiently punished by the temporary withdrawal of this. Only for a beloved person does he gladly give up the undesirable activities and aims, and assumes in imitation, by way of identification with adults, what culture, in the shape of this beloved object of love, demands of him.

Outside of the negative and positive hints and stimuli which pedagogy can gain and make use of, from the results of psychoanalytic investigation of the mental life of the adult, in the education of those who have failed, the practice of pedagogy offers frequent opportunity for bringing into direct application the psychoanalytic viewpoints and technical aids, where we have to deal with children and youths who are already in false paths, to influence favorably and to prevent further, perhaps serious injuries, even before they have opportunity to encroach in devastating activity upon the social life. Excluded from pedagogic influence in this sense are feeble-minded, morally deficient or degenerate individuals, as well as outspoken neurotics, whose treatment should be left to the analytically trained physician. In spite of these limitations, there is open to the pedagogues and also, as the promising works of the Zurich pastor, Dr. Oskar Pfister show, to the spiritual adviser, a rich and fruitful field of work, which, as yet, lies as good as fallow. A mass of childish peculiarities, which are either not at all, or falsely understood, and are usually rendered worse by the bad pedagogical measures, reveal themselves to the educator trained in psychoanalysis, at first glance, as neurotic traits determined by the unconscious; the early recognition of these traits in the period of their appearance in youthful age, can easily render them innocuous; at the same time, the neurotically disposed individual is enabled by such attention to enter upon the struggle for the control of his instinctive life, better prepared. Everyone who has experienced, even in a few cases, the satisfaction of having childish faults, as meanness, stubborness, shyness, lying, stealing, fear of work, which faults had obstinately resisted every pedagogical influence, disappear as result of the psychoanalytical tracing back of these activities to neurotic attitude toward the parents, or false dis-

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placement of instinct, indeed, often to see these vices give place to opposite virtues, must give expression to the conviction that psychoanalysis is destined to perform invaluable service to the science of education. But further, certain severe clinical symptoms, as anxiety conditions of definite kind (fear of animals, pavor nocturnus, etc.), idiosyncrasies (against foods, persons, objects), eccentricities and mild nervous symptoms of physical nature (stuttering, nervous cough, clearing of the throat) prove by their neurotic character and the easily attainable influencing from circumstances under the control of the educator, to be accessible objects for pedagogical psychoanalysis; at any rate, they are recognizable, in statu nascendi, to the analytically trained educator, and where it is necessary, can be referred early to medical treatment.

In general, one may say that psychoanalysis, as it has already progressed far beyond its originally purely therapeutic significance to a science, indeed to a mental movement, also gains its pedagogic application beyond the field of individual prophylaxis in a social significance as a positive educational theory. And if also the psychoanalytic direction of investigation calls upon it to proceed, always of necessity, from the unconscious mental life, still, it is not to be overlooked that in ultimate end, psychoanalysis strives for the better control of this unconscious by constant widening of the conscious field of vision. Therewith of course, is imposed on man, who, with the beginning of civilization, had to learn to renounce the direct utilization of certain sources of pleasure, and with the gradual progress of culture, also the wish compensations of these, described in the foregoing chapters, a further denial, which is counterbalanced by the intellectual factor of pleasurably toned knowledge and conscious control of his own ego, as well as the outer world itself, up to a certain degree. In this renunciation of the pleasure principle in favor of adaptation to reality demanded of humanity, education is our most valuable means of assistance, since it can prepare the young and growing human child for this adaptation at the right time, show him suitable ways to substitute gratification, and thus make him adapted to the civilized life, while it avoids and prevents the flight into the old mental attitudes which have been abandoned as unsuitable.

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NERVOUS AND MENTAL DISEASE MONOGRAPH SERIES No. 26

The Technique of Psychoanalysis

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NEW YORK AND WASHINGTON
NERVOUS AND MENTAL DISEASE PUBLISHING COMPANY
1918

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NERVOUS AND MENTAL DISEASE PUBLISHING COMPANY

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PRESS OF
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LANCASTER, PA.

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PREFACE

"Not in his goals but in his transitions man is great, and the truest state of mind rested in, becomes false." [Chinese Proverb.]

The traveller in a foreign land who keeps to the main highway needs no guide. He does not even have to know the language of the country for a judiciously distributed *pour boire* will put him in touch with all the more common requirements of his surroundings.

With his Baedeker in hand, he may even wander about in strange surroundings oblivious to the unknown claque about him and return to his haven of safety with an outline of the topography of the city, its bricks and mortar, and possibly its trolley cars. But were he to go into the by-ways, were he to reach out for an understanding of the rich life that is actually being lived about him, he is more or less shut off, and deaf and dumb must needs grope about if without knowledge of the language of the country.

The doctor of medicine is in some such a position—his unexplored countries come to him, however, he does not go to them. His Baedekers—Gray, Osler, and perhaps a rich library, furnishing the details of many complicated structures—lead him through the more frequented paths of disease processes, but, like the real traveller he not infrequently finds himself lost in unexplored territory. A new language strikes his ear at every specialistic frontier that he would pass; a rich and apparently hopeless terminology has to be mastered if he would travel in new fields, and if he would know what is going on over the boundary he must make it a part of himself.

It is of no service to him to rationalize his indolence by calling this speech new-fangled, absurd or unnecessary. To shut his eyes and ears to these new languages, refusing to learn them, only hampers himself, and the stream of active intelligence goes on, leaving him in an eddy of his own isolation.

Words are only tools to be used to cut into the facts of nature, so that fellow workers, through mutual understanding, can make a concerted effort and clear a pathway into the secrets of life. The simplest act of reflection will show that the more complex the situation, the greater will be the confusion of new tongues and the greater will be the need for the construction of new

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tools—words—to aid the explorer. This is why the problems connected with the study of mental activities have so rich a terminology and one constantly undergoing evolution.

Bones, tendons, muscles, intestines, hearts, lungs, have been much alike for countless centuries, and have modified little in their structures, but the nervous system, an active, changing master-spirit in evolution, is constantly reaching out in its attempt to grasp the infinite.

Even the simplest aboriginal inhabitants of an Australian village are giants in mental development when compared to the earliest products of the age of man. Historical retrospect can but imperfectly reconstruct the stages of primitive culture, but the connecting links between aboriginal and modern races are there. The ethnologist, the archeologist, the anthropologist, the student of language, of customs, of laws, of religions has a rich material, and already the data available for the understanding of the development of civilization and of culture surrounds the student of human nature in bewildering profusion.

The races of the twentieth century are partakers in this heritage of a bountiful past and the individual of to-day is its product. To completely understand him entails a knowledge of the principal gifts of this inheritance, and he who would grasp the innermost causes that sway the human mind must be able to reconstruct the stages through which that mind has come in its development from primitive culture to modern conditions. "What are we," queries Bergson, "in fact what is our *character* if not the condensation of the history that we have lived from our birth—nay even before our birth, since we bring with us prenatal dispositions?" "Doubtless we think with only a small part of our past, but it is with our entire past, including the original bent of our soul, that we desire, will, and act."

These "prenatal dispositions," this "original bent of our soul" are a part of the inheritance of which we speak. Everything in human life, individual as well as social, has then its historical background, its origin, its life history and thus its adequate working interpretation. Nothing is trivial, nothing is fortuitous.

Psychoanalysis outlines the task of interpreting human motives from this point of view. How; it will be my privilege to more fully set forth.

"While we sit still we are never the wiser; but going into the river, and moving up and down, is the way to discover its depths and its shallows."

BACON.

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INTRODUCTION

The present series of articles is planned for the beginner in psychoanalysis. They therefore will contain little that the trained analyst does not already know. If because of their simplistic character they prove of service to the neophyte my purpose will have been accomplished.

At the outset it seems desirable to give a general outline of what psychoanalysis is. For this a bare definition will not suffice. The word itself is almost as indicative as such a definition might reasonably hope to be. Psychoanalysis is primarily to be considered as a method. As such, it seeks to establish a knowledge of the development of individual human motives. Just as a chemical analysis serves to determine the ultimate composition of this or that substance present in nature, so psychoanalysis has for its task the unravelling of the ultimate causes of this or that manifestation of human conduct. Psychoanalysis then is merely a tool, just as chemical analysis is a tool—both are methodological disciplines working with different facts of nature, each seeking to determine ultimates in their respective spheres; the former dealing with data of that portion of the nervous system functioning to adapt the individual and the race to reality, the latter working with the inorganic and organic substances making up a large portion of that reality.

Not to extend this particular analogy too unduly, it may be added that inasmuch as chemical analysis is restricted only in its choice of material, so psychoanalysis need have no barrier for its activities. It is not a method limited solely to the solution of problems of psychopathology any more than chemical analysis is confined to the study of pathological human substances. All of the questions arising in relation to psychological activities may be investigated by the psychoanalytic method.

It seems to me desirable in this place to clearly emphasize the fact that in psychoanalysis we are dealing solely with a method for gaining data since one frequently hears the statement that psychoanalysis is nonsense. A method, or a tool, is not nonsense. Chemical analysis is not nonsense, although bad quantitative or qualitative chemical methods may lead to false or nonsensical results. The individual chemist may be badly trained in his

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methods and be a poor chemist. This does not invalidate the methods of chemistry. Again certain substances may be so complex in their structure as to defy even the best chemical methods at separation and identification; this argues only for the comparative crudity of the known analytic resources. It can readily be conceded in an analogous sense that the psychoanalytic methods now developed may be comparatively crude, but this only supplies a motive for their betterment rather than an argument as to their falsity.

The crudities of those social instruments, the law and medicine, are known to all men, but only the sick egoist argues to do away with all law and all medicine. Those healthy nervous systems capable of adaptation to the realities of nature are endeavoring to improve law and medicine. They seek to minimize their crudities and make them better instruments for the obtaining of human happiness. In this, as well as in many another task, the methods of psychoanalysis are destined to play an enormous rôle in the near future.

In this place, I can only indicate some of the fields of activity in which psychoanalysis, as a method, has already rendered important service, leaving for future consideration, when I hope to present a summary of the development of the method, the more complete statement of its spheres of operation.

It is chiefly in the realms of psychopathology that psychoanalysis first showed its value; those chapters in medicine devoted to the study of the neuroses and psychoneuroses having been entirely remodelled by its application. In a similar manner the understanding of certain of the psychoses, particularly schizophrenia (dementia præcox), paranoia, and the manic-depressive group, is undergoing marked transformations as a result of the psychoanalytic methods. That large chapter of alcoholism which is not an object of interest to medicine alone, but enters into almost every sphere of human life, is having most penetrating and far-reaching light thrown upon it by the students of the psychoanalytic school.

A new science and application of pedagogy are being reared upon the data obtained by psychoanalysis, as witness the masterly work of Pfister recently published and made the forerunner of an important series of works on pedagogy under the leadership of Meumann and Messmer.

The students of history, anthropology, ethics, religion, philos-

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ophy and art are beginning to feel the value of the material obtained by the methods of psychoanalysis, and already a shift of position with better generalizations is making itself apparent.[1]

It is not my purpose, however, to sketch any such ambitious program in these pages. I shall content myself with the rudiments, and shall deal more particularly with simple medical problems; with such as are met with by the average practitioner, or those that come more directly to the student of nervous diseases.

I believe that every sincere practitioner can practise psychoanalysis just as he can practise surgery. In the latter case, with a fundamental knowledge of bacteriology he may cut just as far as his anatomical knowledge and experience permit him. He may limit himself to minor surgery, or he may attempt more difficult and complicated operations. So with the methods of psychoanalysis, if the practitioner will make an earnest attempt to understand them, he will be enabled to be of enormous service even when only using the simplest fundamentals. There are numerous sick individuals who do not need a complex analysis, because they have not developed a complex neurosis. Such can be relieved or cured by the application of the rudiments of psychoanalysis. This is particularly true in the pedagogic field working with developing children. On the other hand, it is important for the general practitioner to know that the complicated cases need a more complete grasp of the methods, just as an operation upon the brain requires more than a general knowledge of the principles of minor surgery.

The statement that we are dealing solely with a method, however, is incomplete—it is necessary to ask what is the method intended to do? and furthermore why is a special method needed?

It has already been said that by psychoanalysis one seeks to establish a knowledge of the causes for human behavior, that all of the psychical activities may be investigated by its means, and that it deals with data of the psychic life in its function of adaptation to reality. It thus seeks to establish a basis for the understanding of human conduct.

Such broad statements, however, are entirely too general, especially for the purposes I have in mind in these pages. We shall limit them here more particularly to the individual principles of human behavior, especially in their application to definite med-

[1] The Significance of Psychoanalysis for the Mental Sciences. Nervous and Mental Disease Monograph Series, No. 23, edited by White and Jelliffe, New York and Washington.

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ical situations. The psychoanalytic methods which will be here outlined then will bear solely upon practical medical problems confined within comparatively narrow bounds. We intend to learn by them why certain symptoms of disease come into being, and what the meaning of these symptoms is for the individual's adaptation. We may then be in a position to properly estimate the modus operandi of the disorders under discussion and may possibly eliminate or modify them for the benefit of the sick individual.

And why is a special method needed? This latter question can only be answered completely after a more extended review of the situations which are to be analyzed. It can be stated here broadly that medicine had not been able to satisfactorily explain the import of many so-called nervous symptoms. The hypotheses were inadequate. Many, in fact most of them, proceeded along lines of chemical analogy.

Pituita, black humors, perverted chemism, faulty metabolism, auto-intoxication, indicanuria, etc., these are links in a long historical chain of such interpretations, the incompleteness and unsatisfactoriness of which have been demonstrated for thousands of years. Such interpretative formulae might attempt to explain why an individual with an incipient schizophrenia, for instance, should believe that it was absolutely necessary for her when going up a pair of stairs "to go three steps and then stop or else suffer from constipation." They would say that it was due to gastro-intestinal fermentation, possibly a parathyroid hyperactivity, or a deficiency of hypophysis secretion. For the sake of discussion it may be admitted that possibly such a disease as schizophrenia may arise from one or other of these or analogous metabolic disturbances, but even so wherein does this knowledge aid in an understanding of the "three steps or constipation" symptom?

Perhaps the symptom is meaningless and neither needs nor can obtain an explanation. This attitude of mind can be understood. It is very old. It has fostered the type of organic explanation just mentioned. On the basis of the nonsense of the symptom a still more nonsensical interpretation is given. But let it be assumed that the symptom means something, that it is as real as a dyspnea, and arises from necessary psychical antecedents, then at once it becomes apparent that "auto-intoxication, perverted metabolism," etc., are of no value as explanations; they must be abandoned.

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This is all preparatory to saying that the content of an idea, a psychological fact, can never be explained on the basis of perverted chemism, and that every idea, for we shall deal with ideas —mental facts—has a basis which is as absolutely determined as any other reality of nature.

This fundamental postulate that every psychological fact is a bit of nature with definite laws is the reason why a new method of investigation had to be found. The chemical, bacteriological, pathological laboratories had shown their sterility in this particular field of enquiry.

Even recognizing this bankruptcy, so to speak, of organic explanations for psychological phenomena it may be further recalled that academic psychology has been far from being a promising guiding principle. There have been a number of reasons for this, but two psychological tendencies, which had received the official sanction of the schools, may be touched upon since the psychoanalytic method has shown their inadequacy for its particular problems.

For many years official psychology was limited to the so-called physiological psychology. This was practically little more than a detailed physiology of the special sense organs. Its study developed a mass of information relative to the receptors and the conducting mechanisms of the special sense organs, facts of great importance, but of little applicability in getting at explanations for human conduct.

Another important attitude of psychology was its insistence upon what it was pleased to call its "norms." The famous dictum that the abnormal in mental life could only be understood from a study of the normal has been one of the chief obstacles to progress. Such an attitude of mind could only have come from the laboratory worker unacquainted with the progress made in the empirical biological sciences. For here the great advances in knowledge have come from the pathological side. The normal has been built up out of the pathological. Hence, when Freud, rejecting all of the dicta of the official and reigning schools of thought, constructed his psychoanalytic method upon pathological data, he followed the path of experience in the other biological sciences, and by avoiding the sterile psychology of that fatuous nonentity the "normal mind" founded a method of great value.

No previously existing system of thought could properly form a working hypothesis to explain why for this or that individual

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it was necessary for the patient to "go up three steps or else be constipated," or other analogous symptoms which will occur to the reader and which are found in abundance in all pathological cases, be they hysterias, or compulsion neuroses, phobias, schizophrenias, or what not.

The medical historian, acquainted with the various hypotheses, can see the thread of truth that runs through all of them. Each new century has brought better and better explanations, but it was only when, towards the Charcot era, a definite parting with structural concepts took place, that psychopathology gained a definite right to state to the student of academic psychology that it had to be reckoned with, and that previously existing systems of thought, even philosophies, would prove inadequate if the pathological data of medical science in the psychological sphere were neglected.

A method, therefore, which would bring together and unite into a genetic or dynamic concept these data of psychopathology was much to be desired. It saw its earliest systematic beginning in the days of Charcot but it remained for Freud to forge the tools of psychoanalysis, and make them of value for every student of psychical phenomena.

That same historian viewing human endeavor in its search of the absolute must realize that psychoanalysis, like other tools that *homo faber* has constructed, will undergo changes and developments. The very facts of nature that it reveals will cause it to be modified, and if it remain sufficiently plastic, it too can evolve.

It is no part of the present program to follow any dogmatic presentation, but I would remind the reader that a simple statement of the outlines of the psychoanalytic methods inclines towards a certain amount of positivism which I would gladly avoid if it were possible.

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THE TECHNIQUE OF PSYCHOANALYSIS.

CHAPTER I

The Material to be Analyzed. What Patients not to Analyze

"There is no vice," says Rochefoucault, "that is not better than the means taken to conceal it."

A change of heart has taken place in many quarters of the medical profession with reference to the so-called functional manifestations of the nervous system. The neurotic is no longer to be jeered at and made fun of. "Truth from (their) lips prevails with double sway, and fools who come to mock remain to pray." That multitude of patients who "have nothing the matter with them" has commenced to be seen in its true colors. The members of that much greater multitude who have "so many things the matter with them," and who, as Dejerine very pointedly remarks, make up at least half of the practice of most physicians, will soon be seen, not in the light of sufferers in this or that organic realm, but as having psychogenic illness, which make them sufferers just as truly as those with "nothing the matter with them." When these truths become the universal heritage of the profession then the medical iconoclasts and jeerers, such as the likes of Pliny, Molière and Bernard Shaw, will have lost an attribute of their vocation and can devote their energies to constructive rather than destructive criticism. At the present time, however, medicine needs the quips of Shaw to accent its many fads and foibles.

The first requirement of the analyst then is a sympathetic attitude towards his material. To pooh-pooh a symptom as "nonsense," as "imagination," as "silly," as "make believe," or "malingering" is an assumption which has no value from the standpoint of the understanding of the symptom. Such an approach to mental problems is rather an index of the naïveté and indolence of the assumer. These universal human attributes must be reckoned with and overcome. Thus the analyst becomes a

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good listener. This listening does not mean the turning of an indulgent ear to the plaints of the sufferer, but a comprehending and grasping curiosity that counts "nothing as trivial, nothing as fortuitous." The analyst must hunger for information about the patient's ills, being ever on guard against formulating interpretations before the returns are all in.

All this takes time!

In an opening Dialogue between Philopiro, a physician, and Misomedon, his patient, written by a Dr. B. Mandeville[1] some two hundred and fifty years ago, I find the following.

Misomedon: I have sent for you, Doctor, to consult you about a distemper, of which I am well assured I shall never be cured.

Philopiro: Whatever your case may be, Sir, it is a great Misfortune you entertain so ill an Opinion of it; but I hope, your Disease may prove less desperate than your Fears represent it.

Misomedon: It is neither better nor worse than I tell you, and what I say, is what I am convinced of by Reason, and not a suggestion of my Fears: But you think, perhaps, I'm a Madman, to send for a Physician, when I know beforehand that he can do me no good. Truly, Doctor, I am not far from it: But first of all are you in haste, pray?

Philopiro: Not in great haste, Sir.

Misomedon: I am glad of that, for most of your Profession either are, or at least pretend to be in a great hurry, But tho' you are at leisure, Can you hear a Man talk for half an hour together, and, perhaps, not always to the purpose, without interrupting him? For I have a great deal to say to you, several Questions to ask you, and know I shall be very tedious; but if you can bear with me I'll consider your Trouble, and pay you for your Time, and Patience both. Can you stay an Hour?

Philopiro: Yes, Sir, or longer, if there be occasion."

From which it may be seen that in 1685 as well as today, the physician has failed to understand these patients, and has neglected to give *time* to their study. If the physician is unwilling to utilize a great deal of time he can never make an analysis.

Sympathetic insight, intense work in obtaining many statements of what are facts to the patient, ofttimes with innumerable apparently trivial and unimportant details, and time are the primary factors in the opening of an analysis.

[1] "A Treatise of the Hypochondriack and Hysterick Diseases in Three Dialogues." London, 1685.

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This outline is a commonplace to the trained analyst, but I am here writing for the beginner, who wishes to obtain a working knowledge of a method. No other attitude of mind will bring any useful results. A beginner in chemistry who does not believe there is anything in the atomic theory, that H_2SO_4 as a symbol for something is nonsense, and that the two sides of a chemical equation convey no information as to what is going on in a chemical reaction is not likely to become a chemist and much less a competent authority on chemical problems.

Still another situation is in need of emphasis before we approach the patient. This is the subject of diagnosis. The young student is prone to pin his faith to names. They seem very definite to him. Hence he always seeks the diagnosis, and can then "consult an authority" or "read it in a book." He is prone to shut the book before him, the patient, and read what somebody else says about something he knows nothing about, *i. e.*, this particular problem. The diagnosis of the mental side of the problem is an absolutely negligible matter for the opening of an analysis. One's object is to find out what is going on in the patient's mind. The interest should be concentrated on the correct ascertaining of the symptoms and on *processes,* not on *names.* All diagnoses, it hardly seems necessary to say, are purely artificial creations for social purposes. They represent useful generalizations for subsequent comparison and discussion with *others* later on in one's investigations. The attitude of mind that feels that its task has been accomplished when the patient is labelled—hysteria, compulsion neurosis, neurasthenia, etc.—will never grasp nor comprehend the living process going on within the patient. All enquiry stops when one dogmatizes at a diagnosis. The beginning student, therefore, should thrust the idea of the mental diagnosis aside for the more vital problems of getting the facts. Naturally the physical diagnosis, if there is one, is another question which will be taken up.

Mental Facts.—In obtaining the initial history of a patient, one's attitude should be an absolutely impartial and uncritical one. One should avoid all leading questions, and, in the words of Misomedon, one must be willing, yes anxious, "to hear a man talk for half an hour together, and, perhaps not always to the purpose, without interrupting him."

This "talk" may be hastily jotted down, or written in shorthand, or an effort made to remember it as one sees fit, which detail will be discussed later.

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If one is not certain regarding a detail, the patient should be asked to repeat, or explain further, or try to make it absolutely certain just what he means by the statement made. Thus, a patient says "everything must be clear."

(Just what do you mean; give me an example.)[2] "Why under the bed must be clear; the bed must be clear; the closet must be clear."

(How?) "Why I must spread newspapers under the bed, then I can see that it is clear. I must roll up the sheets, and the mattress, and then I am sure that it is clear. I put white papers in the closet and am sure it is clear."

(Why?) "Because I must make it clear that there is nothing there. No Booey (negro) element there."

This may be as far as such a line of enquiry will take one for the time being, or one goes on to another symptom. In a very short time the analyst experiences the pleasant sensation that the patient feels that some one is really trying to understand what is going on in his mind.[3]

It should be the analyst's endeavor, in getting the preliminary history, to listen with great care to the patient's own explanation and not endeavor to correct it. Usually the explanation is a correct one, but it is expressed in terms other than those which the non-analytically trained physician usually employs. If the analyzer does not understand what the patient means, it will be pretty certain that the patient will not understand what the analyzer means should he attempt to explain the symptoms. Until the analyzer has grasped the exact significance of the situation, as the patient sees it, it is nonsense for him to offer an explanation. It is of the highest importance not to explain too much to the patient about his neurosis in the beginning. The detailed reasons for this will appear later. It is, up to this point, only necessary for the analyzer to believe that the patient's explanations *must* have some truth in them.

I am speaking here of mental explanations, not of the banal

[2] Parentheses indicate the analyst's enquiries; the patient's answer follows.

[3] Thus recently while listening very attentively for an hour to the "ravings" (?) of a lunatic, the patient suddenly grasped her ear and repeated "rubber ear, rubber ear, rubber ear." This turned out to mean: (1) You are listening to what I am saying, (2) I am listening to what you are saying, and (3) some one else is listening at the keyhole. The patient's husband was listening at the keyhole.

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interpretations which include "too much uric acid," "a bit of nerve tire," "an acid stomach," "floating kidney," "eye strain," etc., which have been suggested. Even the medical explanations —given by the patient—bits of misconstrued physiology and the like, these also should be carefully listened to, not with incredulity and impatience, for the patient has accepted them in good faith usually from a former physician in whom there once was confidence.

After the first unburdening of the patient's mind takes place the real work of history taking begins. This may have occupied one or two visits. The first task now involves a rigid sorting process. A complete physical examination is usually necessary. The symptomatology will often determine just how minute the examination must be.

It must never be overlooked that physical disturbances may exist side by side with psychical ones. It is not my purpose to discuss the relation of the one to the other in just this place, but I hope to make it clear where a practical division may be made so far as psychoanalysis is concerned. Anybody may be analyzed to his advantage. A patient may be greatly benefited even if his headache be due to a brain tumor, but to take the position that such a procedure would be justifiable for the treatment of the tumor is naturally farcical. It would be on a par with the hypnotist's treatment of a mild emotional excitement due to a syphilitic arteriosclerotic cerebral softening by the metronome, or the internist's treatment of the same by valerian, asafetida or bromides; for forsooth was it not hysterical?

Complicated emotional states due to or accompanied by physical disorder are constantly being met with, and the beginning analyst must be on guard not to overlook such a somatic disorder. On the other hand entirely too much stress may be laid upon the latter and the needs for a mental house cleaning overlooked. Even so profound a disturbance as the ataxia of tabes, with its well-known anatomical substratum, contains, according to as good an observer as Maloney,[4] a very large psychogenic factor in fear, which reinforces the ataxia and makes many bedridden who could otherwise walk with but little difficulty.

In the domain of gastro-intestinal disturbances one constantly meets with this interrelationship of the physical and psychical. In the great majority of cases, the analyst sees the patient only

[4] *Journal of Nervous and Mental Disease*, November, 1913.

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after many months of ineffectual gastro-enteric therapy. Under such circumstances the need for analysis is obvious. Gastrointestinal references are the most frequent in the psychoneuroses.

"Man lives to eat" and probably more interest enters into the average man's gastronomic ceremonials than into any other form of expression. It is not to be wondered at, therefore, that the "stomach" should play such a large part in the neuroses and that such a mass of ignorance and superstition should still be found in all classes of society relative to the nutritive instinct. Extremely primitive and animistic notions concerning the food function and the processes of digestion still hold sway even among physicians. The dietary fads of the latter have been subjects for ridicule and satire for years and not without a certain measure of justification. Concerning these and the general subject of the nutritive instinct more will be said later.

Before passing to the consideration of the detailed history of the patient which is necessary from the psychoanalytic standpoint, attention should first be directed to those types of patients who should not be analyzed.

What Patients Not to Analyze

Perhaps the most important thing for the beginner *to know* is *what not to analyze*. Even the trained analyst may find to his distress that he has unwisely started a psychoanalytic procedure to learn later that the method in general will not bring about the hoped for result, *i. e.*, the betterment of the patient. For some patients psychoanalysis is not the method to employ. The psychoanalytic viewpoint however should be held to nevertheless.

Experience is rapidly accumulating relative to this matter and it is my purpose to discuss some of the bearings of this experience in the following paragraphs.

The *what not* to analyze is intimately related to the *why not* analyze and hence they must be discussed at the same time.

In most respects there are no rules pertaining to psychoanalytic methods which do not apply to other methods of investigation utilized in medicine in the large. Being methods dealing more particularly with psychical activities going on in the human organism, which activities are plastic and variable, at first sight the material obtained seems more intangible than that obtained by the use of methods which investigate the workings of nature at other levels, *i. e.*, the reflex and the physico-chemical. To illus-

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trate: let it be assumed that certain tests are made to determine the sensory and motor functions of a limb. These modes of examination have revealed paralysis with flaccidity, hypotonus, diminution in electrical response, defect in epicritic discrimination, painful nerve trunks, swollen, boggy skin, mild cyanosis, etc. These results lead one to conclude that the peripheral sensory and motor neurons in the affected area are undergoing certain alterations. These the science of neurological medicine summarizes under the broad symbol "neuritis." The *facts* are tangible, one says, because the *symbol,* neuritis, can group them and handle them as an entity. Intelligence puts the facts—apparently quite definite and determined—together, and draws what it calls a logical conclusion.

The beginner in neurology, it is true, may assume that only one *thing* is represented by the *term* neuritis, and his query may be how to "*treat*" *neuritis, i. e.,* a symbol, not a thing. The more experienced neurologist is aware that after all there is no dynamic conception behind the term neuritis—the word only symbolizes a series of results and contains only indirect references to causes—*i. e.,* changes induced in nerve impulse conducting structures (nerves—muscles) by various agents, toxic and mechanical. Enquiry should reach out for a genetic conception, and finds it either in alcoholic, diabetic, typhoid, influenza or other type of poisoning, or in mechanical factors due to a syphilitic meningitis in the cervical cord, dura, a spinal cord tumor, an osteoarthritis of the cervical spine, a cervical rib, etc. Determinism now stands revealed; ignorance is dislodged, and intelligence applies the best possible means, chemical or surgical, to overcome the difficulty. This is called logical. The whole chain of events is based on determinism of facts seen at reflex, *i. e.,* sensorimotor levels of the nervous system. One might find illustration after illustration which on final analysis would be reducible to the single thesis of determinism in the facts of nature at least so far as physico-chemico-vital combinations of phenomena are concerned.

As we have seen, the psychoanalytic method assumes the same postulate, namely determinism, for that category of facts which, so far as we are now able to see, may adequately be grouped under the symbol psychical. The very criteria to be applied in solving the "neuritis" problem, here used as an illustration, are pertinent for psychical situations. If the facts obtained seem intangible,

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incomprehensible—such terms denote simply our ignorance of the many determinants, *i. e.*, the dynamic factors. There can be no intangibility resident in the facts. To say the facts are incomprehensible is a rationalization of individual ignorance.

Ignorance, however, may be no fault. It becomes so only when the individual permits himself to rationalize it, *i. e.*, give it a disguise, which effectually blocks him in the utilization of his intelligence, which might otherwise solve the problem in hand. Rationalization, therefore, becomes a Janus faced servant of both ignorance and indolence, permitting neither to recognize the other and thus it proves an aid to inertia, that fundamental property of matter which in our school days was defined as "that property by which a body at rest tends to stay at rest until set in motion."

Fortunately, however, for human evolution, Newton's theorem goes on to say that "when set in motion it tends to remain in motion until stopped." Therefore, if one is able to recognize ignorance frankly—is able to avoid rationalizing it, such an individual may be free to choose his pathway.

But then, why do we say there are patients who should not be analyzed? Is this a rationalization of ignorance?

Let us examine into this? Is it *impossible,* or is it *unwise* to analyze them? If impossible, why? and is such a permanent or a temporary condition? If unwise, is it (*a*) Because it will be of no service to them; (*b*) Are there advantages and disadvantages; (*c*) Do the disadvantages work (*c*, 1) against the patient, (*c*, 2) the social body, (*c*, 3) oneself; (*d*) Would psychoanalysis be distinctly *harmful* to patient, to society, to self?

Stated in tabular form, we have the following general scheme for discussion.

I. Impossible to use psychoanalysis.
   (*a*) Always.
   (*b*) Temporarily.

II. Unwise to use psychoanalysis.
   (*a*) No service, neither good nor harm; never, or just then.
   (*b*) Advantages of psychoanalytic treatment less than its disadvantages.
      1. Disadvantages to patient.
      2. Disadvantages to society.
      3. Disadvantages to analyst.
   (*c*) Do harm
      1. To patient.

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2. To society.
3. To analyst.

I. *The Impossible Cases.*—The first type of patient that cannot be analyzed is the ignorant one. Under this heading a great variety of patients pass in review. In the first place are the idiot and imbecile. Many despairing parents hear of the new discovery, "psychoanalysis" and they bring their idiot or imbecile children to be "cured" by the psychoanalyst. A neurological examination may reveal the dynamic factor; either an hereditary defect of transmission, a birth injury, an infantile encephalitis, a congenital syphilis, etc. A Binet-Simon test affords a rough and ready means of obtaining the patient's intellectual status; a careful pedagogic enquiry estimates the grade of the chances of educability.

The problem now arises, just what series of criteria will determine the character of the advice to the parents, so far as psychoanalysis is concerned? If study of the dynamic factors of the defects should reveal that there is a hope of relief, *i. e.*, one can remove a working cause such as possibly in congenital syphilis, in cretinism, in a number of defective states due to definite sensory losses (bad eyes, ears, lymphatic constitution, dysthyroidism, dysgenitalism, etc.)—then the advice to the parents should be that at the present time the patient should be treated for the causative factor. Psychoanalysis can be of no service until later possibly. Afterwards the question may come up as determined by the results of surgical or specific opotherapy.

Should no such possibly alterable dynamic factor be revealed, and should the real causes for the defects stand out as unsurmountable, and a Binet-Simon or other series of intelligence tests show inability by the patient to grasp abstract ideas, *i. e.*, mental age of five to seven,[5] then one must tell the parents that psychoanalysis, while it may prove of great value in clearing up certain scientific facts which may be of some service to the mass of science, and hence indirectly valuable to society at large, so far as this particular problem is concerned offers no adequate return to the individual patient. The condition is not treatable by the psychoanalytic method. The still further question of advice as to treatment in general does not lie within the province of these remarks.

But should the analyst, either as general practitioner, or neu-

[5] See Colvin and Goddard in White and Jelliffe, Modern Treatment of Nervous and Mental Disease, Vol. I.

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rologist, undertake the treatment of the patient, although he may have attempted to make it very clear to the parents and friends that psychoanalysis is of no service and that he cannot use it, nevertheless he must be prepared to hear the criticism that "psychoanalysis is of no service, because Dr. so-and-so (himself or other physician) treated so-and-so (said idiot or imbecile) by it, and he did him no good," all based upon his particular "failure" in the type of patient just discussed.

To show that this is no phantasy, I shall state that I received a letter from a parent in a Western town relative to treatment by psychoanalysis of an imbecile daughter—apparently determined by an epidemic cerebrospinal meningitis at the age of 4–5. In short, I declined to treat the patient, and gave the names of a few schools where feebleminded children are cared for and trained, and there the matter ended so far as I knew. I do not know how to characterize my reactions when, from a neurologist of reputed attainments, I learned a year or so later of the bad results of psychoanalysis at my hands, in this individual case.

This is a extreme type of misrepresentation that has caused "the evil things said of physicians," not outside of their ranks, but even within them, from the Roman Pliny's first characterization of the Greek physician Asclepiades of Bythnia to Bernard Shaw's skit in the "Doctor's Dilemma." A liberal dose of humor will aid the beginner to digest such misrepresentations in his early attempts to do the right thing.

What should be the advice if the patient be shown to be able to use abstract ideas, and yet be a high grade imbecile or moron?

Here it is imperative to recognize that for the beginner at least, and especially for the young beginner, psychoanalysis is of little or no service.

Many of these patients slip over into the group where possible harm can result. The harm can result if the analysis is clumsy—as it is apt to be by the beginner, and secondly, results, in reality due to the imbecility, feeblemindedness, etc.—chiefly in the field of sexual delinquencies—will be attributed to the analysis. Furthermore if a positive transference is set up matters may be then rendered very difficult and even dangerous (socially) for the analyst because of the patient's abundant sexual phantasies. This feature will be discussed more fully under a later section.

In general then all somatic feebleminded types are inapplicable

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to psychoanalysis so far as therapeutic aims are in view. Psychogenic types are particularly fit for psychoanalytic therapy.

The contrasting or *demented* types form another large group. Here "dementia" is used as a broad and loose conception similar to "feeblemindedness." Yet the same criteria may be applied to them. If the deterioration of a once fairly average intelligence is a result of irreparable factors, and the grade of deterioration is such, as outlined by intelligence tests (Sommer, Ziehen, Kraepelin, etc.), that intellectual plasticity is gone and new concepts cannot be grasped, then psychoanalysis is impossible.

There are a number of older patients who by reason of emotional upsets (loss of wife, husband, or money) appear far more deteriorated than they really are. Here a partial analysis may clear up the emotional disturbance and render the patient much better able to handle his conflicts. As a rule a complete analysis is unnecessary—often impossible. There may be enough plasticity for these patients to grasp the chief mechanisms at fault. They are not growing old gracefully, one might say, but they are not plastic enough to be made over and the analyst is unwise who would attempt it.

General paresis is not to be analyzed save from the standpoint of scientific interest. Inasmuch as cyto-biological tests should make it impossible to confuse the early "neurasthenic" signs of paresis with a psychoneurosis, there is now little justification for the loss of valuable time entailed by the use of *any* other form of treatment than that for the syphilis.

Patients with other dementing processes, alcoholic, presenile, tumor, etc., are likewise impossible and should be rejected. Very valuable psychoanalytic material may be obtained from the "ramblings" of a senile dement, or a paretic, but such apply to the interpretative art which may be of service for other patients rather than of value in the treatment of the producer of the symptoms.

Acute maniacal states are manifestly unapproachable—*i. e.*, so far as the present outlook is concerned. The productivity of such patients is often readily analyzable, and one's psychoanalytic comprehension obtains invaluable illumination from them; one may obtain a complete picture of the entire conflict as it is bursting like a Gatling gun.[6] Such an interpretative analysis may be of great service later on when the patient has made a spontaneous recovery but practically all attempts to modify the course of an

[6] McCurdy, State Hospital Bulletin, 1913.

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acute excitement in a manic-depressive psychosis by analytic procedures have proved unavailing.

Similar conditions rule in other acute excitements. Acute and subacute deliria may be impossible to analyze if very acute. The subacute delirium of alcoholic hallucinosis in an intelligent individual may give surprisingly good results by modified analytic treatment, however, and also lead to the uncovering of the motives for the alcoholism.

Acute katatonic excitement is unapproachable. If a positive transference becomes established the patient may be controlled somewhat, but there are few analysts who have worked enough with katatonics to enable them to establish a working transference. Severe depressed states are very difficult or impossible for the beginner. They are nearly all potentially suicidal and all of the precautions of the older methods, especially in guarding against self-destruction, must be held in mind[7] in approaching these cases. Psychoanalysis reveals suicidal ideas earlier and more definitely than any other procedure and hence is justifiable for a short time. Mild depressed states in the young are very amenable to psychoanalytic treatment.

Mute patients are unapproachable, but it should be remembered that there may be patients who while verbally mute yet speak in every movement of the body. Only the trained psychiatrist with analytic tendencies can interpret these, however, and they should offer only opportunity for observation and study rather than hope for therapy in the hands of a beginner. I have sat by a mute katatonic for an hour attempting a variety of openings with all the zest which in my younger days had been given to a game of chess. One must be anxious to do just that sort of thing if one hopes to surprise nature into giving up a psychical fact.

Certain homosexual types are to be approached with considerable caution. Negative transference may readily be set up and then such patients babble and gossip about the analyst and malign and slander him most amusingly. They go about calling this or that reputable and painstaking neurologist a fakir or a quack—two epithets too frequently bandied about by careless narcissists.

II. The groups for which psychoanalysis would be *unwise* are naturally less capable of clear formulation. Wisdom and lack of wisdom being comparative terms their use as guides to conduct imply that the problems are open.

[7] See Farrar, White and Jelliffe, l. c.

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(*a*) There is a group of patients which does not come within any clinical classification so far as neurology and psychiatry are concerned for whom psychoanalysis is not impossible but for whom we can expect little from its application. Its application is not going to cure the patient. Some help may be hoped for, but in general the patient has established a fairly good working basis for himself and does not really intend to be disturbed.

It is highly important to recognize this group with its subgroups for there are many individuals in them, and as it is the habit of such individuals to go from doctor to doctor they are the chief factors in carrying gossip, and in giving the usually very tenuous basis for the misinterpretations which result, not directed to psychoanalysis alone, but in all branches of medicine. I call them the "little bird" group. They are all types of personalities, but most of them have little interest in anything, are somewhat introverted, but are capable of establishing a superficial rapport with great ease, and fall away quickly to seek a new attachment. One cannot escape them. Whether one treats them or not they will say things to the next claimant for their favor which conscious as well as unconscious rivalry seizes upon to augment bad feeling among us. They are not infrequently superficially clever. There is an active and passive subgroup. The women are chiefly in the former, the men in the latter. The former are more malicious in their comments on the other doctors. They seem to like to set each other by the ears. They give, if one allows them, the petty gossip of the households. They know all the "backstairs gossip." "Dr. So-and-so treated them for this, but Dr. So-and-so said it was that, and now you are the only one to understand." They are interesting semi-invalids, at times even "kittenish."

Many of these patients do not care to get well. They use their neurosis to keep up a type of "peeping." They will not see themselves, and have little courage to do any real work. Parasitism is a marked unconscious factor. They are molluscs, either dependent upon a mother, a father or brother, or a rich uncle, or some benefit society. The doctor is a vicarious ever-changing substitute, and they give him the little tittle-tattle about his fellow practitioners that he not infrequently though often unwittingly likes.

When once embarked on an analytic treatment with these patients they hang on and on so long as their small vanities and foibles are undisturbed. When the analytic probe bears heavily

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upon these they pout and fall away. A strong insistence upon having "backbone" and "standing up to their task" causes a further flight, this time perhaps to the gastro-enterologist, or the gynecologist, or what not, and the analyst wakes up to find that his work has only contributed to the patient's auto-erotic phantasies, usually of an infantile or adolescent type. Only a wide experience will make one acquainted with all the variants of this type. Essentially they do not wish to get well. To do so would make them have to *work,* and this is impossible.

A further small series of this group is found frequently among the well-to-do. They are not parasites in the sense of the word just used. They may be independent financially, but are encrusted by the usages of their social milieu and are analyzed with great difficulty. The democratic attitude of psychoanalysis, its pragmatic and humanistic tendencies run counter to their aristocratic, rationalistic and individualistic mode of education. They are very indolent. Novel reading, drug taking, alcoholism and social fussing constitute their most frequently used pathways to escape from being bored to death; while auto-erotic fantasy, sexual tittle-tattle, definite liaisons or perversions may be the chief excitements that apparently give value to life.

They buy attention with their money; look for flattery and self indulgence, and utilize the physician as a blind for the carrying out of their desires. They expect to be told to do the proper thing in "cures." If their set goes to Carlsbad or Hot Springs they expect their medical advisor to know the present styles in sanitaria, health resorts, etc., and use his prescription as a lever to move obstacles, if such exist. Psychoanalysis is far too serious and circuitious a method to interest them beyond that which may have previously stimulated their curiosity regarding its so-called "sexual sniffling." Since in actual psychoanalytic practice no such thing exists such patients as a rule lose interest and move on to a "new" medical interest that will amuse them. Gastro-intestinal lavage has great vogue with this group, contributing as it does to satisfy their anal erotic trends.

(*b*) The group of patients for whom psychoanalysis would be more disadvantageous than advantageous is difficult to outline; yet for the beginner certain patients are best let alone. The advantages to be gained are doubtful.

I would place in this series those individuals who do not seriously take up the subject. They may be somewhat sick but out

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of motives chiefly of curiosity, they begin on a psychoanalytic procedure, but soon fall by the wayside by reason of the time needed, the cost, or the mental application. They may start in all sincerity but they are more or less superficial natures who tire readily and "do not see the use." They are unwilling to go through the process of mentally dissolving themselves in order to obtain a sometimes unflattering likeness of themselves.

Many narcissistic individuals belong to this group.

(*c*) One may read in the form of general statements made by a number of critics of the *harm* that psychoanalysis may do. These critics are all in accord in denying to the sexual any etiological significance, yet strangely enough psychoanalysis, thought of by them as dealing solely with sex matters, can do the very thing that they say is impossible for sexual ideas to produce. Exact details are not available, and one awaits the analysis of Hoche's[8] anti-psychoanalytic questionnaire, which was launched in 1913 with all of the signs of an active partisanship. The three histories quoted by him are ludicrously inadequate. This is not the place chosen to discuss the various objections to the psychoanalytic procedures, or to the hypothetical concepts that underly them. Psychoanalysis is not a subject for general debate. It is too intimate a thing to permit discussion. One may say what one has observed and leave the matter at that.

It may readily be admitted that bad psychoanalysis exists, and that such can do harm; but there is much bad medicine and bad surgery evident wherever one may wish to turn. Meddlesome surgery is a by-word—so may meddlesome psychoanalysis become one. Freud has already fully discussed what is well termed "Wild Psychoanalysis,"[9] a paper that all aspirants to psychoanalytic understanding should thoroughly know. Fictitious psychoanalysts will arise. They are already to be found on the board walk at Atlantic City, and other places, with the palmist, chiropractic, etc.

Even the harm done by "bad psychoanalysis" may not be as great as that done by a "good neurologist," who as a result of an examination of a patient with a neurosis gives a learned diagnosis, lays down minute rules as to diet, regimen, hydrotherapy, etc., and

[8] "Ueber den Wert der Psychoanalyse," *Archiv. f. Psychiatrie*, Vol. 51, 1913, p. 1055; "Eine psychiche Epidemin unter Aerzten," *Med. Klink.*, 1910, No. 26.

[9] "Selected Papers on Hysteria and Other Psychoneuroses," Nervous and Mental Disease Monograph Series, No. 4, 2d ed., Chapter XI.

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yet is oblivious to the dynamic factors of the disorder under consideration. The analyst may have set up a strong antipathy, yet, because it contains a real element of dynamic interpretation, it may ultimately work out to the patient's good unconsciously, whereas the learned diagnosis, which often is nothing more than the analysis of the *acquired meaning of a word,* may shut the door to a minute investigation of the *behavior of a thing,* and the patient, under rationalistic dogmas, is treated for one series of symbols after another, yesterday uric acid, today gastro-intestinal toxemia, tomorrow dental sepsis, and all without essential relief. This type of so-called orthodox medical treatment may go on for years and the final chronic nervous breakdown has to be patched up in some way if possible.

Beginning analysts should avoid working with hysterical young people; they should not attempt a compulsion neurosis without some experience, and only after considerable work will an analysis of a beginning dementia præcox fail to perhaps temporarily increase the patient's excitement. Most harm may come to the analyst himself. With paranoid præcox, or certain of Kraepelin's paraphrenic group[10] the untrained analyst is liable to establish a negative transference and later actual violence may be attempted upon him. He may be assured that malicious gossip will be directed against him.

A similar state of affairs may result from the analysis of certain compulsive states, and the analysis of homosexual situations is best let alone by the beginner for closely related reasons.

With reference to compulsion neuroses, the beginner should be on his guard against taking on free cases. These patients are analyzed with great difficulty; they take an immense amount of time, spread over many months, and unless the analyst is prepared to make a complete analysis independent of personal sacrifice, he is wiser not to embark upon one. If he is compelled by stress of economically more important work to neglect the patient, especially if he be a male—usually all with strong homosexual components in their libido,—he is liable to set up negative transferences, and the patient is apt to curse the analyst right royally. One trained in psychoanalysis recognizes that after all behind this vituperation in the unconscious their lies a very great regard for the analyst so inveighed against, but such patients' utterances

[10] See Singer, "Kraepelin's Concept of Dementia Præcox," *Journal Nervous and Mental Disease,* June, 1914; Kraepelin, "Lehrbuch," 8th ed., Endogene Verblödung, 1913.

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when heard by others constitute a large part of the as yet detailed evidence against the value of psychoanalysis. Still the analyst who has committed this fault out of his sympathy for one in great distress, should know that he is liable to harm himself the most. He rarely harms his patient, although the stupid outsider is apt to take it as a great faux-pas on the part of the analyst.

Particular caution should attend the analysis of young girls suffering from hysterical attacks, especially when such represent distorted erotic fantasies, or when the hysterical symptom serves as a direct sexual (in the narrow sense) gratification, and represents a part of the sexual life of the individual. Here a very strong transference is apt to result which often contributes new symptoms to the neurosis. The development of such new symptoms serves to emphasize the necessity for not continuing an analysis, or for putting it in the hands of a woman physician trained in analysis.

Psychoanalysis, even of a most careful kind, at times does harm to the analyst as well in many such cases. The almost pathological transference causes the patient to interfere with the analyst's time, and when she is rebuffed, strong resistances develop and the hysterical patient becomes an active enemy to the physician. She talks about him continuously; discusses all his affairs, particularly how he tried to misuse her (her own non-realized wish-fulfilment). She carries gossip and scandal whereever she can get an opportunity, and may be able to place the analyst in a very unpleasant position.

In justice to many hysterical patients however it should be said that bad psychoanalysis cannot hide behind even this well recognized situation. In the majority of instances, the analyst has been partly at fault in creating such a condition. He may fail in his duty, and succumbing to his own weaknesses, redouble the patient's erotic fantasies by excessive tenderness. He thus creates new situations which involve him as well as his patient in the greatest difficulties. (See chapter on Transference.)

One not infrequently finds that a certain group of patients unconsciously start out with the idea of getting the analyst "interested" in them. They then slowly or rapidly substitute one group of symptom symbols, usually at first highly resistive by their opposites, namely great solicitude and interest in the analyst and his work. They unconsciously flatter the analyst and finally may succeed in getting the upper hand. The psychoanalytic probe

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can no longer do its work. The analyst is powerless. He has perhaps succumbed to his own (auto-erotic, money) complexes, and his usefulness is seriously hampered.

This type is seen particularly in daughters where the father is somewhat of a tyrant. Notwithstanding a violent conscious antipathy on the part of the daughter to the father, the dreams are apt to show definite father image phantasies and the "prostitution complex" is fairly well marked. The girl is usually willful and spoiled; usually gets a poor education and thus with but few libido channels open usually turns to social forms of exhibitionism, ofttimes very ingeniously masked, and becomes an accomplished breaker of hearts. Those with strong father fixation phantasies are very inconstant. They are the Kipling Vampires. Psychoanalysis makes them even more dangerous since they learn better to conceal their "cat and mouse" game. When beauty, wealth and social postion are combined the analyst who establishes strong transferences must be specially on his guard.

If the analyst will realize that every transference also contains a strong resistance, and that he, the analyst, is only a surrogate for the father or brother image of the infantile libido of the patient, it should serve to keep him from losing sight of the main object of a psychoanalytic cure, *i. e.*, the making of the patient free and independent of his infantile fixations.

It must always be borne in mind by the analyst that the psychoanalytic method develops special means by which strong transferences are set up, just as in hypnosis similar transferences may be seen, but in a much more limited group of cases. It also should provide the analyst who is conscientious in his work with special means for handling these usually very strong transferences which are seen in all types of neurotics. (See chapter on Transference.)

That which is true of hysterical states is doubly so with manic-depressive psychoses. These are dynamite bombs and may cause much anxiety to patient as well as analyst. In a number of instances the results of even a few talks are very promising; occasionally this promise holds good, but more often the transference becomes unmanageable to the patient and is apt to cause much discomfort unless handled with great skill. A thorough psychoanalysis is best avoided. Stekel has called attention to this and as a result of his experience warns against the analytic treatment of manic-depressive states.[11]

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My own experience confirms his and shows how the transference may become violent, passing over to most persistent lovemaking. On repulsing these patients, a thing which cannot be avoided, although it must be done very carefully, they reject the idea that their love is only a transference, a father-image phantasy; they threaten to make away with themselves, unconsciously to arouse the analyst's sympathy, and gain tenderness and physical contact. They "will not leave the office," "they are only just so many patients," "they are numbers." They are very jealous of the other patients and soon make it impossible for the analyst to carry on his work. Much will depend upon the cultural type as to just how one can avoid these unpleasant cases. With individuals of fairly well-grounded intelligence one can avoid their falling into states of great depression where they threaten to kill themselves or kill the analyst. Stekel advises a course of Dubois'[12] reëducation dialectics for these patients rather than a true analysis in the Freudian sense. It is better to deal with more superficial structures and leave the deeper motives untouched.

With some very intelligent individuals with mild attacks, or in free intervals, a very definite gain may be made by a complete analysis.

It is the analyst's duty in these cases to explain the situation to the relatives or friends clearly before offering any relief.

Another very important chapter in psychoanalysis where harm may come to the analyst is that of consultations. At times one is called in by a colleague to see a patient who has a psychoneurosis or a mild psychosis. It may be evident from the start what particular complex situations are at the basis of the situation. To even start an analysis is bad technique, for it is surprising to see how rapidly a transference may be set up in these patients by one trained in psychoanalysis. To permit this transference to start will endanger the analyst's standing with his colleague. He may tell him, if he has the courage, that his enemas, his arsenic, his this and that, are of no service for this particular patient, who needs mental therapy. The colleague will rarely respect the analyst's point of view, nor call him again in consultation. The

[11] Stekel, "Die Ausgänge der psychoanalytischen Kuren," *Centralbl. f. Psa.*, Vol. III, p. 300 in particular.

[12] P. Dubois, "Psychic Treatment of Nervous Disorders." Tr. by Jelliffe and White. Funk and Wagnalls, N. Y.

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colleague may ask the analyst to give the patient a "few" psychoanalytic treatments, as if psychoanalysis were like the "laying on of hands," or he may suggest that a coöperative type of treatment be undertaken; he to take care of the physical ills, the analyst to care for the mental ones. This is also a delicate situation since, as a rule, there are "no physical ills" to be treated. The gastroptosis, enteroptosis, dental sepsis, colon stagnation, etc., etc., so far as that particular case under consideration is concerned, are gross animistic superstitions; the psychical factors are the important ones. It is far better for the analyst to say that the thing is impossible; that the internist should continue to do what he can do, avoid meddlesome surgery, and, after a certain length of time, if nothing is accomplished, turn the case over to the analyst, who will take his try at it, promising to return the patient to his colleague, after a mutually agreed upon reasonable time for treatment. This ideal needs no elaboration. A stage of intellectual culture which permits so many animistic notions to control the thinking of the great majority of the population is not one sufficiently enlightened however to carry out such an ideal.

It is highly important to remember that psychoanalytic explanations are rarely understood by the laity, hence in one's talks with the parents one should avoid all interpretations. The least said to anxious mothers, fathers, other relatives and friends the better. One can only insist that the best possible will be done and results will be the criterion of the treatments. It is highly advisable for the analyst to point out that his treatment is exclusivley medical, and that it is not metaphysical or mental healing, nor anything of that ilk. It is medical sense applied to particular types of problems. It is imperative that one who would practice psychoanalysis should have a medical training, or work in close touch with a physician. The independent non-medical psychoanalyst who pretends to really practice medicine is a doubtful asset to the community. Properly trained psychoanalysts are needed greatly in medicine and the serious one's are willing to work under medical guidance.

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CHAPTER II

The Literature, Source and History of Psychoanalysis

There is no royal road in psychoanalysis, for every analysis is after all a highly individualized problem. At the same time there are general principles, else a technique could not be evolved. In actual practice a number of different approaches may be utilized, and just as in the royal game of chess there are recognized opening, mid game and end problems, so in psychoanalysis one's method of application of fairly well understood and accredited principles must be carefully chosen with special reference to the character of the case in hand.

Among those of considerable experience it is not infrequent to find marked diversity of opinion regarding the chief factors and the most useful methods to be employed in analysis. The beginner is often overwhelmed with *"ex cathedra"* statements "never do this," and "always do that"; Freud says this and Jung says something else; Adler advises so and so, Ferenczi the opposite. One will say, "I always begin this way," another says, "No, begin this way."

This is to be expected in view of the comparative newness of the present methods, and the highly complicated nature of the material to be studied. The analyst himself should recognize, however, that psychological analysis is by no means new, even if that special brand of it, psychoanalysis, has been given a new name, and is without doubt a more concrete and adequate group of working hypotheses than those heretofore utilized.

The interest taken in the mental life is very old. From the earliest times different aspects have been carefully observed. Of modern students of these Dessoir[1] has given us a very useful summary. In this summary the development of the religious ideas, of the vital, natural and scientific processes involved, and of the practical and artistic knowledge of human life are termed psychosophy, psychology and psychognosia respectively. These are three view points, three objective modes of approach to the prob-

[1] "Outlines of the History of Psychology," Max Dessoir, The Macmillan Co., New York, 1912.

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lem of the psychical. In this scheme of things it is clear that psychoanalysis would more clearly be grouped with the third, *i. e.*, with psychognosia.

Early attempts at knowledge of human nature as deposited in maxims and aphorisms are well crystallized in the sayings of the gnomic poets of the tenth to the fourth centuries B. C. The Bible and Greek philosophies contain most of these. Aristotle's studies of the temperaments are full of psychognostic (psychoanalytic) wisdom. From the days of antiquity there are rich collections of autobiographies, tales, lyrics, soliloquies, and day books all having in common the effort of the individual to express himself, to gain self-knowledge. As Dessoir states, schemes of pedagogic moral self-examinations are abundant from the Golden Verses ascribed to Pythagoras of the Pre-Christian era, through Augustine's Confessions (400 A. D.), to those of Rousseau, and the moderns. Even in most recent times the value of such material is most strikingly set forth in Freud's masterly analysis of the Schreber autobiography.[2]

French characterology was a compact mass of rich psychognostic material in which the works of Madame de Guyon, La Chambre, La Rochefoucauld, La Bruyére, and Chamfort stand out as monuments of serious attempts at practical psychology. La Chambre made use of dream, chiromantic and astrological material, and if one will take the trouble to read behind the words it will be seen that he might have been termed a psychoanalyst. Thomasius who used a French version of an early work by Gracian, also a psychognostic of note, as early as 1687, offered the Elector Frederick III the knowledge of the "new invention," by which it is possible "to know what is hidden in the hearts of men, even against their will, from their daily conversation." Thomasius gave a series of rules and regulations by which the characteristics of a man and his conduct might be deduced. Many of these are matters of lay knowledge to-day. Even as early as 1783 P. H. Moritz started a psychological magazine for psychognostic observations. Its program as sketched by Dessoir is illuminating. It showed the following characteristics: suspension of moral judgment, collection and comparison of facts, special attention to half pathological phenomena which lie outside of the ordinary course of mental life, cultivation of child psychology and the psychology of language.

[2] See "Freudian Contributions to Paranoia Problem," by C. R. Payne, Vol. I, No. 1, *Psychoanalytic Review*, p. 77.

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During the 19th century, however, scientific discussion of psychognostic problems stagnated, and were superseded by the novel, which took possession of all the practical knowledge of human nature. It was gradually forgotten that concrete as well as abstract problems of the human soul were accessible to scientific treatment. The psychoanalytic movement is therefore a revival of these earlier psychognostic attitudes towards the understanding of human conduct.

The beginner in psychoanalysis will get a better perspective towards his own work should he review some of this early psychognostic literature. The many "ipse dixits" of his surroundings will find a better placement in the general scheme of things. Some acquaintance with the general development of the history of philosophic systems[3] will also be of considerable aid in understanding the general scope of his patients' special philosophies of life, while a bird's eye view of the intellectual history of mankind is invaluable.[4]

I do not believe that a sound psychoanalytic technique can be built up unless one has a fairly accurate placement of anthropological data. More will be said regarding this material in discussing symbolism, but here it may be noted that the Old Testament and Frazer's volumes on the Golden Bough (Macmillan Co.) are almost indispensable.

I am presupposing, all along, that the aspirant for psychoanalytic knowledge is trained in neurology and psychiatry. An intimate practical knowledge of the latter is essential.

Of the more strictly psychoanalytic literature itself the major part is in German, but a number of the more fundamental studies have been translated, chiefly by American workers. I purpose suggesting some of the more important psychoanalytic papers which the beginner in psychoanalysis should read. It may be emphasized here that *patients* should *not* read them. The works of Freud stand out as most essential. A complete bibliography (1893–1909) of Freud's contributions to psychoanalysis may be found in the *Jahrbuch für psychoanalytische und psychopatholo-*

[3] Putnam, "A Plea for the Study of Philosophic Methods in Preparation for Psychoanalytic Work," Journal of Abnormal Psychology, Oct.–Nov., 1911, p. 249.

[4] J. H. Robinson's "Outlines of the History of the Intellectual Class in Western Europe," Columbia University, 2d edition, 1914, will prove the best guide available for one's general historical reading along these proposed lines.

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gische Forschungen, vol. I, p. 546. Some of his shorter papers are collected in his *Sammlung kleiner Schriften,* 1, 2, and 3d series [Deuticke, Vienna]. A translation of some of these is to be found in volume 4 of the *Nervous and Mental Disease Monograph Series,* "Selected Papers on Hysteria and Other Psychoneuroses" [2d ed.]. Freud's "Three Contributions to the Sexual Theory" (Vol. 7 of the same series in translation) is highly important, also his "Psychopathology of Every Day Life," and his "Interpretation of Dreams." Both of these have been well translated by A. A. Brill (The Macmillan Co., New York). A highly important series of lectures on psychoanalysis given by Freud at Clark University in 1909 is to be found in the *American Journal of Psychology* for 1909, 1910. In the same series of the *American Journal of Psychology* there are important papers by C. G. Jung and S. Ferenczi, neither of which should be overlooked by the beginner. Further translations of Freud are available in his Wit, and Leonardo da Vinci and his beautiful little classic on Jensens, Gradiva ("Delusion and Dreams") all published by Moffatt, Yard & Co., New York. In a series of monographs entitled "Schriften zur angewandten Seelenkunde" [Deuticke, Vienna], edited by Freud, a number of valuable studies have appeared. Those by Abraham, Rank and Riklin are noticed hereafter. Two volumes on Psychoanalysis, both by pupils of Freud, are in Engilsh. They are not systematic presentations but collections of miscellaneous papers, but are of great value to the student. They are by A. A. Brill (W. B. Saunders & Co.) and Ernest Jones (Wm. Wood and Co.). A comprehensive and precise outline of the Freudian postulates is given by Hitschmann in "Freud's Theories of the Neuroses" (Vol. 17, *Nervous and Mental Disease Monograph Series,* in translation by C. R. Payne). This is the most valuable single volume outline of the development of the psychoanalytic hypotheses.

One highly valuable general work on methods is that of Oskar Pfister, "Die psychoanalytische Methode" (J. Klinkhardt, Leipzig). This is a work of 500 pages, written by a teacher and minister, and is especially valuable to the beginner. A translation is obtainable. It contains copious bibliographical references. One other monograph along modified psychoanalytic lines which is of great value is that of Ludwig Frank, "Affektstörungen" (Julius Springer, Berlin). Furthermore L. Kaplan's *Grundzüge d. Psychoanalyse,* and specially Jung, "Wandlungen und Symbole der

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Libido" (translated by Dr. B. Hinkle (Moffatt, Yard & Co., Boston)) are to be recommended. More general approaches may be obtained in Wm. A. White's "Mental Mechanisms, Foundation of Character Formation, and Mental Hygiene." W. Lay has written a short work on "Man's Unconscious Conflict" which may be recommended. Jelliffe's chapter on Hysteria in Osler's "Modern Medicine" contains a discussion on psychoanalysis, and Jelliffe and White, "Diseases of the Nervous System," 1917, is a work setting forth the dynamic concept for all problems of nervous pathology.

It is surprising that the French literature upon psychoanalysis should have been very tardy. Up to the present time the only noteworthy résumé of Freud's writings in French are contained in a volume by Regis and Hesnard—"La Psychoanalyse des Neuroses et des Psychoses." This volume contains a complete, though slightly one-sided, digest of the chief psychoanalytic researches. It is worth having, since it also presents some suggestive bibliography from French and Russian sources.

The periodical literature bearing on psychoanalysis is very extensive. Fortunately it can be more or less readily followed. In 1909 the *Jahrbuch für psychoanalytische und psychopathologische Forschungen* (bi-annual) (Deuticke, Vienna) was begun by Bleuler and Freud and edited by Jung. In this first volume (p. 546) the chief psychoanalytic literature to 1910 is given. In Vol. II of the *Jahrbuch* (p. 316) Jones gives a complete list of all the available English and American work, some 192 titles, much of which, however, is not strictly analytic. Neiditsch (p. 347) gives a short note on the Russian literature, Assagioli (p. 349) one on the Italian literature, while (p. 356) Jung gives a complete summary of the chief contributions of Swiss authors to 1910. The *Jahrbuch* is now in its seventh volume and contains much lengthy and thorough analytical material. Complete abstracts are appearing in the *Psychoanalytic Review.*

The need for a more frequent publication which would present a more ready coordination was met in 1911 by the establishment of the monthly *Zentralblatt für Psychoanalyse,* edited by W. Stekel (Bergmann, Wiesbaden). This contains shorter articles, copious abstracts and literature citations, and was for a time the official organ of the International Society of Psychoanalysts. It is a highly valuable publication for the analyst. For the more general needs of philosophical, historical, ethical and general prob-

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lems which might receive illumination fram the psychoanalytic hypotheses, Freud began the publication of *Imago* in 1912 (Heller, Vienna). It is bi-monthly edited by O. Rank and H. Sachs. Among many stimulating and valuable papers there appear extensive bibliographies (Vol. I, p. 91, Vol. II, pp. 97, 609) of the studies on the application of psychoanalysis to the mental sciences, chiefly on Individual Psychology, Sexual Psychology, Dream Psychology, Occult Psychology, Child Psychology, Pedagogy, Biography, Æsthetics, Mythology, Philology, Religion, and Criminology. These bibliographies are available to the end of 1913.

In January, 1913, the *Internationale Zeitschrift für Aerztliche Psychoanalyse* was founded by Freud with Drs. S. Ferenczi and O. Rank as editors as the official organ of the International Psychoanalytic Society (Heller, Vienna). It is a bi-monthly and covers the same ground as the *Zentralblatt,* which latter has discontinued publication.[5] A. Adler and C. Furtmüller founded the *Zeitschrift für individual Psychologie* (Reinhardt, Munich) in 1913 which contains psychoanalytic material. In the *Journal of Abnormal Psychology* (Badger, Boston), psychoanalytic material will also be found.

The only journal in English is the *Psychoanalytic Review* (Nervous and Mental Disease Publishing Co., Washington) which aims to be catholic in its tendencies, a faithful mirror of the psychoanalytic movement, and to represent no schisms or schools but a free forum for all. It is now entering its fifth year and contains original articles and very extensive and complete abstracts of all of the periodical literature.

The *Journal of Nervous and Mental Disease,* and the *Nervous and Mental Disease Monograph Series* have also contributed several psychoanalytic studies. The most important of these in addition to those already mentioned are the translations of Jung's *Psychology of Dementia Præcox,* Bleuler's *Schizophrenic Negativism,* a short but highly suggestive study, Abraham's *Dreams and Myths,* No. 15, Rank's *Myth of the Birth of the Hero,* No. 18, and Riklin's *Wish Fulfillment and Symbolism in Fairy Tales,* No. 21. The History of the Psychoanalytic Movement by Freud, No. 24: Silberer's Problems of Mysticism and its Symbolism, Translated by Jelliffe.

With these sources the beginner will be able to put himself in touch with the current literature on any problem. Special bibliographies will appear in these pages from time to time.

[5] Discontinued October, 1914.

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Since these pages appeared in serial form a number of additional works have appeared to which attention should be drawn. One of the most satisfying is White's "Mechanisms of Character Formation," Macmillan Co., 1916. Wilfrid Lay has also written an excellent small work, entitled "Man's Unconscious Conflict," Dodd Mead & Co. This will be found useful to the lay reader who is desirous of learning of the general principles of psychoanalysis. Dr. I. Coriat has written a primer of psychoanalysis under the title "What is Psychoanalysis?" in a series of questions and answers. It is useful for those who need to have definitions made for them in simple and concise form. As a primer it is useful. E. B. Holt's The Freudian Wish is a valuable work from the psychological school.

Complete or abbreviated studies are obtainable in the *Psychoanalytic Review* which presents the entire range of the psychoanalytic movement.

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CHAPTER III

Opening of the Analysis. The General Situation and Preliminary Formulations

The best preparation is a complete analysis by an experienced psychoanalyst. This is difficult to obtain since so few physicians are willing to give up the time. Continual self analysis is requisite during the course of analytic work. The analysis of a resistance always shows psychoanalytic scotomata on the part of the analyst. It is through the resolving of these unconscious blindspots of his own that the analyst is able to free his patient. The would-be analyst should work resolutely with his own dreams, if possible with the aid of some one versed in psychoanalysis. A few passing remarks at a street corner or at a chance meeting are worse than useless.

The Beginnings

The first meeting with the patient is of great importance. One should observe every little sign, for many neurotics have "suffered much of many physicians" and are usually supersensitive and highly critical. Little occurrences should be carefully noted, sudden reddening, twitching of the fingers, tapping of the hand or foot, restlessness, looking about, gestures, dryness of the mouth, changes in expression, variations in pupils, perseverations, repetitions, circumstantiality in narration, apparently irrelevant and quick jumps from one subject to another, gaps, mispronunciations, retardations, and slowness in places. Note carefully, ***but avoid mentioning,*** small contradictions, also observe over-scrupulousness in details, attempts to be very precise and exact and all small things. They are of importance in psychoanalysis. Adler and Freud[1] were the first to call attention to the fact that at times the very first sentence uttered by the patient contains the clue to their whole general situation. The analyst should also recall that he is under a close scrutiny as well and should hold himself as impassive as possible, yet be appreciative, anxious to learn and genuinely receptive. Neurotics are for the most part unusually sharp and intuitively penetrating. They cannot be deceived very long.

[1] *Bemergungen u. e. Fall v. Zwangsneurosen, Jahrbuch,* I, p. 366.

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The patient will usually tell why he or she has come and what the symptoms are. If patients come with parents, relatives, etc., it is wisest if possible to get the patient's story alone and first. At times this is not possible. Often it may be advisable to get the parent's story first, when one can say to the patient "You tell me your own story. I have heard what some one else thinks, but you are the sick person and your story is what I really wish to understand. I wish to learn from you at first hand." The first hour should be wisely used to gain as much confidence as possible.[2] Such confidence is gained largely through the patient observing that the analyst is really listening and understanding. For patients who have had many physicians this is highly important.

The history of the development of the difficulty, as the patient sees it, is usually a much distorted product, yet it is entitled to first place in credence, and it is bad psychoanalysis to attempt to break down the patient's attitude towards the disorder and its causes in the opening as well as at any time during an analysis. For this as well as a number of reasons, the analyst should explain little or nothing, least of all attempt to do away with the symptoms by explaining them until the entire situation is grasped and the analyst has a fairly accurate knowledge of the disorder.

It is usually impossible to prevent the outpouring of all of the symptoms. This freedom of expression is encouraged by some analysts, discouraged by others. It is usually true that the symptoms are repeated over and over again and many patients have them all written down, in order that they may not forget them. A certain amount of this repetition should not be prevented; it not infrequently contains important variants, yet the analyst soon must tell the patient that such a repetition is often beside the question. It is frequently a ruse on the part of the unconscious to divert the attention away from the real difficulties. It is as if the physician's regard should be constantly directed to let us say, a pitting edema of the legs to the neglect of a leaky heart valve. It is like the reaction of the flushed partridge that rises many yards away from its nest.

One may take the history systematically, guiding the patient along certain points, history of the family, etc., but it is preferable to say to the patient, "Tell me all about yourself, and I shall listen. If I am not quite clear as to what you mean I shall ask you in detail, but tell me everything that comes to your mind."

[2] Stekel, "Nervöse Angstzustände."

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Some patients are reticent, however, under such instructions, and may not tell anything. For such, a gradual drawing out is necessary. One may follow any scheme, but it is often a good one to go over more or less systematically the family history, first with reference to their diseases, then with reference to the patient's relations to his family, his parents, the brothers and sisters, their ages, etc. The early relations to teachers, nurses, governesses, tutors, etc., is of equal importance.

The family units must be firmly grasped by the analyst in all the small details, for out of these the family neurotic romance has been constructed by the patient.[8] Herein will be found the early character lineaments which later on become the subject matter of the analysis.

It is not over advisable to take up the numerous details of the history of the patient chronologically since the emotional development is not arranged by years, yet major events which will serve as definite dates in the life history should be jotted down.

It is a striking fact that most neurotic disorders, using the term in its broad sense, have a fairly definite starting point. For the most part the patients are able to say just when the symptoms began. The exact hour or day must be noted. It is not accidental. "The trouble began exactly three months ago after the death of my mother," says one patient. Another recalls that her "*fifteenth* birthday was forgotten by her parents; she saw her physician on the *fifth* of the month; made an hysterical suicidal attempt on the *twenty-fifth*." Still another tells that she "had a bad cold, she had used up all of her handkerchiefs, when she used a piece of paper to wipe her nose. It was at this instant that she felt that her nose began to grow larger." Another felt that "he had a mission in life as he saw that the seat of the President's daughter in the theater, No. 9, tenth row, corresponded to the birthday of his brother, the ninth of October" [x, 9].

As one gathers these histories one finds similar precise details. Such should be gone over carefully, as they almost invariably have some very definite relationship to the symptomatology of the neurotic disorder. At times they flash the diagnostic signal and the chief unconscious complex difficulties.

Great care should be taken to have the patient go over in considerable detail every little incident of the onset of the difficulty.

[8] Rank, "Myth of the Birth of the Hero," Nervous and Mental Disease Monograph Series, No. 18.

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One will rarely find an adequate explanation in the usually highly rationalized account given by the patient, yet the correct dynamic situation is usually contained within it and will stand revealed later on in the course of the analysis. It is often by reason of a patient's persistent reiteration of a statement that one gets very important clues. Thus a patient suffering from an hysterical anxiety depression—termed a melancholia—during an hour's consultation repeated at least half a dozen times "how good her husband was, how true he was, and how much she loved him." It was not at all surprising to hear later of his very open use of almost enormous sums of money to keep up an extra marital establishment, ostensibly for his "out of town customers." That which a patient so frequently asseverates consciously often conceals a directly opposite unconscious trend.

A psychoanalytic history differs in many respects from an ordinary medical history. It is largely built around the patient's story. Some analysts have constructed elaborate questionnaires. These are often of a great deal of service. Thus Hoch and Amsden have published a highly elaborate "Guide to the Descriptive Study of the Personality With Special Reference to the Taking of Anamneses of Cases of Psychoses."[4]

The personal constitution is difficult to define and schemes of this nature are often very useful in indicating to the beginner what groups of facts are liable to prove of value. It is for the same reason that reference has already been made to the Binet-Simon tests as of value in excluding various forms of the feebleminded as not being proper subjects for psychoanalysis. Inasmuch as in all analytic work great accent falls upon the affective life of the individual, the questionnaire of Hoch and Amsden is particularly useful since it devotes much attention to the affective reactions of the individual. The questionnaire cannot be repeated here, only its general features are indicated. I. Traits relating essentially to the intelligence, the capacity for acquiring knowledge, the judgment, etc. II. Traits relating essentially to the output of energy. These factors of work and of play are of much value in the first survey of the patient, in sizing up his adaptability for analysis. III. Traits relating to the subject's estimate of himself. IV. Adaptability to the environment: (*a*) traits which on the abnormal side interfere in a general and striking way with environ-

[4] *Review of Neurology and Psychiatry*, Vol. XI, 1913, p. 577. [Schulze, Edinburgh.]

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mental contacts; (*b*) traits which in a more specific, but in a less obvious way, interfere with contact with the environment; (*c*) traits which show to what extent the subject lays bare to others his real self; (*d*) traits which in normal proportions are useful, but which in exaggeration interfere with efficiency; (*e*) traits which show a tendency to active shaping of situations, or the reverse; (*f*) traits showing attitudes towards reality. V. Mood. VI. Instinctive demands, or those traits more or less closely related to the sexuality: (*a*) friendships; (*b*) attachment to members of the family; (*c*) attitude towards the sexes, general, specific and related thereto, as for instance idiosyncracies, or story telling, niceties, etc. VII. General Interests. VIII. Distinctly pathological traits.

A formal psychognostic appraisal such as this just outlined is of great value from a descriptive standpoint. It is almost imperative in cataloging and classifying human types, but a too strict application of it will usually defeat the purpose of a psychoanalysis. It is of descriptive not therapeutic value, and yet practically all of the material must be covered in a psychoanalytic history. But it should be reached by a much more casual and natural method.

It being assumed that the patient has had at least two visits during which a fairly complete history has been obtained, the next step is to determine whether the individual should be analyzed at all. A consideration of the types already spoken of should be made and if the patient is not to be analyzed, the situation should be so stated, if there is any occasion for it. The treatment of the patient will then go on on general lines as determined by the needs of the case. A neurologist or psychiatrist is not necessarily only a psychoanalyst, any more than an internist is committed to the exclusive use of quinine for every ailment.

If it seems that the patient has the right qualifications, and has a disorder for which analysis is adapted, it is in general good technique to say that as you see the condition it seems advisable to begin a psychoanalytic procedure, *but* you would prefer to see the patient for a week or two weeks, from perhaps five to eight times, before you are willing to say exactly what is wrong, what can be done, what the program will be, and what it will cost. This preliminary program is highly advisable. In the first place, it may soon develop that the patient is not analyzable. He comes within one of the classes outlined in the previous chapter. He

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may not be serious about it, or possess the necessary intelligence. There may develop definite social reasons why one analyst should not do the work whereas another might. It may be that the necessary rapport cannot be set up. These patients must not be dangled along. One must analyze them or not. There are no half-way steps—unless one is open and frank about it and not call bumble-puppy an analysis. The critics of psychoanalysis are mostly recruited from this group of patients who coming a few times are usually told that they are not wanted. They say many evil things of the physician. Or it may develop that the patient is an incipient schizophrenic, or, utilizing Kraepelin's conception, a paraphrenic. Should the diagnosis of schizophrenia develop out of the preliminary treatment, and it often takes longer than two weeks to feel out a schizophrenic or an hysterial trend, it becomes a question of judgment whether to attempt an analysis. For myself, I have seen a great many early schizophrenics. It has been my custom to tell the parents or friends that I consider the illness very grave, and that it is as yet an open question whether psychoanalytic procedures will prove of any service. So much is known, however, that no other mode of approach has even offered any attempt at an understanding of what is going on in the patient's mind. The results are problematical. One will do all that one can do, accept the responsibility, but make no promise of curing the patient. One is in the same situation as an internist with a typhoid, or as a surgeon with a fairly diffuse carcinomatous process. Only the charalatan promises a cure under such circumstances. Special problems arising from special groups will develop later in these pages.

The preliminary work of treatment should begin as a real psychoanalysis, but the analyst will have said very little to the patient about the general scheme, or what he is attempting to do, beyond asking the patient to do most of the talking, and entering into the proper unfolding of the unconscious only as it comes up. It is frequently of service to get a dream or dreams which have been dreamed before coming for treatment and it is of much value in guiding one's self, to obtain the first dream that the patient has after starting treatment. No special stress should be laid upon these in the beginning, but they should be written down, and put aside for future reference.

A great many patients who are in need of psychoanalysis cannot afford it. It seems costly to the patient, while not partic-

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ularly remunerative to the analyst, because of the great amount of time necessary. It is not only this however which makes it necessary to get the money question out of the way, but it is as Freud has well pointed out[5] that money as a complex is as difficult to deal with as sexuality. It follows the same general trends and needs to be handled openly and frankly. The analyst asks concerning the patient's circumstances and makes his agreement. Inasmuch as one will see the patient four or five times a week, sometimes daily, excluding Sunday, many patients prefer to pay a monthly amount. This usually settles all questions, conscious or unconscious, as to the cost of such treatment.

It is highly undesirable to treat patients for nothing. Strong transferences are set up which interfere with the getting well of the patient.

Naturally the patient desires to know how long it will take. On this point one cannot be positive as so much depends on what develops in the treatment. One can in general say that patients who really need a psychoanalysis—who are not indulging in a luxury so to speak—need at least two to three months treatment. Most severe hysterias need from five to eight months, and patients with compulsion neuroses usually need more time. One can often aid a compulsion neurosis to such an extent that they are very much relieved after four or five months or even in a shorter time, but to cure them takes often a year, or more. Naturally there are some patients who cannot be cured. They ***will not*** be cured.

Patients themselves will vary a great deal. At times they even continue to be sick longer than seems necessary, as will later be developed. This is a problem of a somewhat mismanaged transference. In general it is often helpful to work for a definite point. The goal is to be reached in a certain time.

It is by no means infrequent that the analyst will be expected to work marvels. All new movements in medicine have their "wonder periods" and patients who have been sick ten, fifteen, twenty years, have visited literally hundreds of physicians and spent all of their own and other people's means, expect to be made well by coming into an analyst's office. Psychoanalysis has resolved some very obstinate cases, but it is not yet in the miracle working category.

[5] "Weitere Ratschläge zur Technik der Psychoanalyse," *Int. Zeitschrift f. Psa.*, I, 1913, p. 1. See p. 225, *Psychoanalytic Review*, Vol. I, No. 2.

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In reviewing the very large literature which has appeared up to the present time (over a thousand titles) it may readily be seen that the claims made by those who have been practicing psychoanalysis have been very conservative,—in fact, such conservatism appears in inverse ratio to the vituperation heaped upon the psychoanalyst and the analytical methods by stupid critics.

It is important to tell the patient not to discuss the question with any one until they have had enough experience to do so intelligently,—when of their own accord they have it borne in upon them that it is usually hopeless to attempt to make those who do not wish to see any the wiser. The would-be critic is usually in the position of one who, unable to decipher his own Chinese laundry check, immediately feels competent to discuss the whole subject of Oriental languages, history and culture.

It is very rare that one is not expected to give some explanation of what one is going to do: This calls for some form of preliminary statement. No two individuals can be approached in the same way, but it is not bad technique to tell the patient, after the general history may have begun, that the chief work of analysis is to enable the patient to see his or her unconscious. That it is in this form of mental activity that the chief causes for the disturbances will be found. This will probably lead to an inquiry as to "what is the unconscious?" The unconscious is after all a way of looking at things—an hypothesis like all other mental concepts—and it will vary with each analyst's previous training, and each patient's intellectual status as to how the idea can be developed.[6]

White has well said that the unconscious is our historical past. Bergson's idea of the unconscious is often a useful one to use. He states it somewhat as follows:[7] "For our duration is not merely one instant replacing another; if it were there would never be anything but the present—no prolonging of the past into the actual, no evolution, no concrete duration. Duration is the *continuous progress* of the past, which gnaws into the future, and which swells as it advances. And as the past grows without ceasing, so also there is no limit to its preservation. Memory is not a faculty of putting away recollections in a drawer or of

[6] See White: The Unconscious, Vol. 2, No. 1, *Psychoanalytic Review.* Review.

[7] Bergson: Creative Evolution. Tr. by Mitchell. H. Holt Co., N. Y., 1911. An important work for psychoanalytic insight.

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inscribing them in a register. There is no register, no drawer, there is not even, properly speaking, a faculty, for a faculty works intermittently, when it will or when it can, whilst the piling up of the past upon the past goes on without relaxation. In reality, the past is preserved by itself automatically. In its entirety, probably, it follows us at every instant; all that we have felt, thought, and willed from our earliest infancy is there, leaning over the present which is about to join it, pressing against the portals of consciousness that would fain leave it outside."

And then follows a masterly sentence which epitomizes a very important aspect of the Freudian doctrine of the unconscious which is followed by an extremely clever formula, which can be applied to the entire psychology of the unconscious. Coming as it does from an entirely different source and from a different angle it is worth calling special attention to and to advise the young analyst to "get it." "The cerebral mechanism is arranged just so as to drive back into the unconscious almost the whole of this past, and to admit beyond the threshold only that which can cast light on the present situation or further the action now being prepared—in short, only that which can give *useful* work. *At the most, a few superfluous recollections may succeed in smuggling themselves through the half-open door. These memories, messengers from the unconscious, remind us dimly of what we are dragging behind us unawares.*" Herein may be seen the Bergsonian formula, which Freud has so well analyzed, and to which the latter applies the concept, *mismanaged repressions,* which, smuggling themselves through the half-open door, become modified in ways to be discussed later, and show themselves as the "symptoms" of the neurosis.

Many a wise aphorism has touched upon this situation for what is called the normal, among them that of Rochefoucauld who says, "There is no vice that is not better than the means we take to conceal it." But we are not through with Bergson. He continues, "But even though we may have no distinct *idea* of it, we *feel* vaguely that our past remains present to us. What are we in fact, what is our *character,* if not the condensation of the history we have lived from our birth,—nay even before our birth, since we bring with us prenatal dispositions? Doubtless we *think* with only a *small* part of our past, but it is with our *entire* past, *including the original bent of our soul,* that we *desire, will,* and *act.* Our past, then, as a whole, is made manifest to us in its

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impulse; it is *felt* in the form of *tendency,* although a small part of it only is *known* in the form of the *idea.*"

Lyell, in his celebrated essay on the antiquity of man, carried human beings back many thousands of years as to their origin, but the psychoanalyst teaches that the unconscious started much further back than the coming of man, and really the "tendency," the "impulse" began with the coming of life itself. This was many millions of years ago. In building up the notion, therefore, of the unconscious for the patient it must be emphasized that human beings have not come to be what they are according to the conception of Topsy, who "specks she jus' growed up," but that for many, many million years the piling up of the past upon the past has resulted in this the last and most highly complicated model-man,—which analysis seeks to partially pick apart to see what is not going advantageously, *i. e.,* not doing *useful* work.

In my own discussions of this problem I have found it advantageous to impress upon patients the immense importance of this time element in the slow elaboration of instinctive reactions, which are so highly conservative and protective, and I insist upon the fact that the neurosis is in line with the whole process. It also is a bit of conservation,—something compensatory and protective, and I call to the attention of such patients similar mechanisms in the life activities of lower levels of the body. Hypertrophies compensate for some insufficiency. Rapid breathing in pneumonia, for instance, compensates for diminished lung capacity, etc.

In further explanation of the scheme I picture to the patient three periods of growth: From conception to birth; from birth to five years of age; and from five years to adulthood. Each of these represents a wonderfully elaborate scheme of reliving the past, through a masterful *recapitulation.* The nine (9) months, forty (40) weeks, two hundred and eighty (280) days of pregnancy (these numbers are here accented as it will be seen how constantly they come up in symbolisms of all kinds) reënact all of the successful experiments of over a hundred million years. The babe at birth already has more than it shall ever acquire. It is a complete machine for self running. It has practically completed its biochemical machinery. Its entire vegetative neurological mechanisms are integrated and functioning. It is ready to pass into the realm of *feeling.* It is to know pleasure and pain, and to build up a sense of the *ego.* Heretofore it has

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led a purely vegetative existence; all of its needs have been attended to within the mother. From the standpoint of individual effort it has been omnipotently indolent. From the organic memory of this stage of the child's existence probably comes the truth of Rochefoucauld's celebrated saying: "Indolence is the most sublime and the most malign of all passions." All of the prenatal influences are laid down; the hereditary, constitutional factors, which eugenic studies are analyzing, are all there. All of Adler's constitutional inferiorities are there. This is a period usually thought of by students of mental phenomena as of the least importance, but from the standpoint of the unconscious, and for the purposes of instinct analysis, it may readily be seen that it is a period of great importance, although maybe it escapes, and will for some time, most attempts to be analyzed. Most of our medicine at the present day occupies itself with the consideration and study of this, the biochemical, level, the simplest level of the human organism. We shall see that hysterical conversions, compulsion substitutions and psychotic projections can create definite disturbances in the functionings of this level. The great loss of weight in the depressions with marked eosinophilia being only one of many examples, to which attention may be called.

With birth the new element of an enormous branching out of the sensori-motor mechanisms takes place, and from this time on to, arbitrarily say five, a new recapitulation period is traversed. This time the path is shorter; from anthropoidal ape let us say to man of the agricultural period—or highest savage. This is a living over of some several hundred thousand years.[8] It passes through the period of the development of ego consciousness; it develops through the phantasy of pleasure-pain to reality and to the beginning of social consciousness. This is the period of the polymorphous perverse of Freud. This is the most important training period of the child. It is the period during which he will gradually thrust into his unconscious much of the repressed material which analysis will be called upon to interpret.

From whence comes this repressed material upon which the Freudian hypotheses lay so much stress, and which seems such an anathema to those who do not care to see that psychoanalysis contains a constructive program? Psychosynthesis takes place coincidently with psychoanalysis, and man, after all, is the measure of all things. Psychoanalysis deals with factors of

[8] Compare E. Smith: Age of Man, Smithsonian Reports, 1912.

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human experience simply as facts. What a fact is will be left aside for the moment, save that as Protagoras has well said, we build up our truths as we perceive them, each for himself, and each differently. We think alike, *i. e.*, "we agree concerning those things it is necessary to agree about in order to live at all; we vary concerning the things which are not neded for bare existence, even though they may conduce to a life that is beautiful and good. *But it is only when we do not act at all that we are able to live our own private life apart, and to differ utterly from all others.*"[9]

It is this desire to "differ utterly from all others" that has to be brought into line with the facts of reality. This period of infancy is the one during which this conformity to sense experience must take place if the child is to live at all. Here "impulse" makes reaching out a constant exercise, with increased activity if pleasure is obtained, and withdrawal if pain results.

Already the biochemical levels have evolved their tropisms; action and reaction are going on automatically through the mediation of the vegetative nervous system. The anatomical structures which subserve these functions need not now concern us, but it is assumed that the psychoanalyst has some fundamental knowledge of the nervous system; without it he will never rise to the highest levels in psychoanalysis.[10]

But the child has now passed into the realm of more complete sense experience. A further evolution of what ultimately will be handled as consciousness has commenced; many million receptors, sensory receiving organs (six million in the eye alone), suddenly commence to have energy thrust upon them, which has to be handled. Each group of receptors builds up values for itself and for the purpose of its own cell groups. At first there is a marked rivalry among the sensory areas, which through repression later develop coördinations between the various strivings.

[9] Dialogues of Protagoras. See F. C. W. Schiller, Studies in Humanism, Macmillan. An excellent picture of dementia præcox.

[10] For a full discussion of the anatomy and functions of the vegetative nervous system consult Higier, Monograph Series, No. 27, also English text-books of the physiology of the vegetative nervous system. See Eppinger and Hess, "Vagotonia, A Clinical Study in Vegetative Neurology," Nervous and Mental Disease Monograph Series, No. 20; Cannon, "Bodily Changes in Pain, Hunger, Fear and Rage," D. Appleton & Co.; Falta, "The Ductless Glands," Blakiston.

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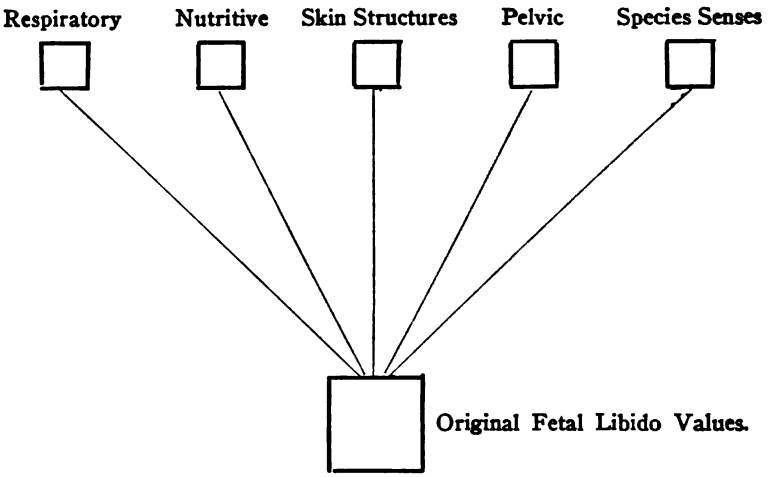
To illustrate this early developmental phase of energy rivalry I have often made use of a diagram which I here reproduce in the rough.

This diagram is meant to illustrate only in a general manner the initial distribution of the sensory areas, which through evolu-



This illustration is purely diagrammatic. It aims to show the first steps in libido distribution following birth. Each and every libido area here represented is a compound which analysis endeavors to resolve.

tion, in response to the principle of pleasure and pain, will ultimately permit of the chief forms of energy distribution which we call human conduct. The world and its values will be built up by the child through these sensory channels.

At birth the entire energy is concentrated on the respiratory act. One hundred per cent., one might say, of the child's striving is expressed in the first cry made in response to the organic need for oxidation (biochemical level). The respiratory nucleus starts its reflex activities and the human mechanism is now working independently.

It is at this point that Freud introduces a new term, *libido*. In this particular instance it signifies the energy of seeking for the organic satisfaction of oxidation activities. Respiratory libido, therefore, constitutes the first libido striving of the child. Crying brings its satisfaction, therefore, *crying* becomes an initial *symbolic act* through which desire, *i. e.*, a renewal of the pleasure, will be *satisfied*.

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I need only call attention here in passing to the marvellous evolution which this respiratory libido undergoes, and which as one of its chief end-products is the complex human speech. Originally, a broad, explosive, non-discriminative cry, a vast conglomerate, the respiratory libido develops little by little an intricate mechanism of highly discriminative acts (speech) of the richest symbolic significance.

The gastro-intestinal libido now clamors for its instinctive (biochemical) satisfactions. The skin must be kept warm (reproducing the amniotic water bath) else the same vigorous protest, as yet non-discriminative, will howl for skin libido satisfaction. Through the combined action of rolling neck motions and smell the nipple is found, and purposeful sucking movements begin, until the incoming stimuli, esophageal, gastric,—through chemical receptors, mount up to a fatigue threshold and sleep intervenes.

Then follow other organic need satisfactions; pleasure is obtained by doing things essential to life. The bladder is emptied, the bowels are evacuated, the eyes look about, the ears hear, etc. The important factor to be recognized and insisted upon is that in the initial phases each libido area is egoistic, self-seeking to the exclusion of all others; the child stops breathing in the early attempts at feeding: all other forms of libido energy wait in abeyance until that one demanding the moment satisfaction is appeased.

It may be recalled that many years ago, Hansemann, a present professor of pathology in Berlin, spoke of "die Anaplasie, die Individualität und der Altruismus der Zellen." He tried to show then how a failure on the part of the cell striving (biochemical level) produced various developmental failures in this or that organ of the body; that even before birth a principle of anarchy among the organs of the body might prevail, and that the best organisms were those in which the subordination of the claims of one cell group (liver, kidney, lung) to the others, was best practiced.

After birth, a similar adjustment in libido values at the sensori-motor level is necessary, and here is where repression commences to be operative. In terms of conscious psychology the process by which this repression is in part furthered is called training or education.

The chief sensori-motor corrective is *pain*. Later we shall see

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that at psychical levels we shall call it *fear*. Wherever fear commences to enter, then the training for social values commences to be manifest. It becomes the corrective for desire.

Positive and negative tropisms, pleasure and pain, desire and fear, these are the chief stages in this evolutionary progression which ultimately brings about adjustment of conduct at highest social values; at ultimate pragmatic realities; *i. e.*, those lines of conduct, which under experimental conditions will permit the best suited individual and the best group to continue to survive.

Repression, therefore, consists in the subordination of certain libido values at lower levels in order that a utilization of identically the same energy may take place at higher levels in the process termed *sublimation*.

In the infantile period, the pleasure principle seeks the continuance of the satisfaction. The term, erotic satisfaction, is used by Freud to signify this in the general sense, by which is meant the gratification of the pleasure sense of the area involved. Thus, there can be respiratory, lip, stomach, urethral, anal, skin, retinal, cochlear, vestibular, muscular, gustatory, and olfactory eroticism. To assume that only one area of the body is capable of receiving sense gratification, and hence that the word, auto-erotism, has reference only to one area, *i. e.*, the genital area, is unutterably stupid, and yet this is the usual implication given to the word by critics. There is ample justification for applying the term, auto-erotic, to each receptor group already indicated, since it has been seen how the interest (libido) may be transferred from one area to another that becomes the center of striving. The very structure of the nervous system through its synaptic integrations shows just how this switching can take place, and Cajal's ingenious hypothesis of avalanche action enables one to see how summations of energy can occur, so that cumulative effects may result. The study of the repressions in the developing psyche shows that these follow precisely similar laws to those which physiologists are working with in reflex blockings, etc.[11]

It is because in the early stages of the infant, each libido area seeks its own satisfactions in interchangeable fashion and anything stands for anything without discrimination, that Freud has used the term, polymorphous perverse. The child has no consciousness of any perverseness: There is no perverseness at this

[11] See Kempf, *Psychoanalytic Review*, Vol. 2, No. 2, 1915.

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period. One can only say there is an eager seeking for richness of sensory satisfaction, and an active exploration of every source of joy and gratification; but, and here reality commences to assert itself, if such seeking is continued at its primitive values, pain, fear, reproach and finally exclusion from the herd result. For if certain of these activities continue into adult life one may speak of them as perverse. Perversion is the conscious end of a long chain of links in which unconscious, auto-erotic satisfaction, *i. e.*, pleasure gratification of an area, is a predecessor and the origin of which is the very life impulse itself.

Steckel has used the phrase, "infantile criminal," to express this same period of the infantile development. The analyst should bear in mind both of these expressions, "infantile perversions" and "infantile criminal," but he should not voice them. It does very little service in the initial stages of an analysis to tell the patient about his "perverse" or "criminal" tendencies. He will not understand, because in the early stages of analysis the patient is constantly thinking in conscious terms. He is as yet unacquainted with unconscious logic. It is only when the significance of unconscious activities get firmly fixed in the patient's mind that the analyst can utilize these terms to advantage. For this reason, and also because perhaps it represents a better mode of approach, it has been my habit to dwell less upon the "perversion" and more upon the evolution of the *sense of power* that goes on in the patient as he builds up values on the basis of his primary pleasure-receiving areas. After all the infantile criminal is only seeking for an expression of power. He is not a criminal until that power impulse forces him to a conflict with reality.

The striving for power is the most important symbol to keep in mind, because it will be seen that practically all the symbolizations which are pictured by the unconscious are being utilized in this way. Protagoras in the dialogue already quoted said that "we think alike concerning those things which are necessary for life." He is speaking of conscious thinking. This uniformity in unconscious impulse is even more striking. Inasmuch as breathing has satisfied oxygen needs, which oxygen-need satisfaction enables the body to live, breathing and all of the necessary muscular adaptations (respiratory libido in the psychoanalytic sense) become symbols of obtaining power in the psyche. Be-

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cause the muscular adaptations for expulsion of the urine from the bladder succeed in keeping the individual alive, therefore these muscular adaptations (bladder erotic, bladder libido) also become symbols of power. Similarly, the need for the expulsion of wind or the expulsion of feces from the intestines may become an expression of power in unconscious symbolization. These acts are all necessary for living. Ergo they represent power. In psychoanalytic terms they represent the several *partial libido trends.* Each trend has its own king and kingdom. It is only when one king strives to usurp the rights of all the others that we can apply the term "perverse" or "infantile criminal."

Analysis, therefore, is to be utilized to trace the evolution of the individual from these infantile sources of power belief, or as we have already expressed it, to reconstruct the pattern of these partial libidos or partial strivings in their building up of the combined libido, which determines the individual's conduct.

Each and every one of these partial strivings must contain a portion of its initial energy concentrated on the primitive exhibition of its power.

It always remains necessary for the bladder to act, as well as the rectum, as well as all of the other parts of the body, and effectually—but in the gradual synthesis of the individual as a whole, and more particularly in his adaptation to society as a whole, the partial libidos, or the sense of power resident in an organic satisfaction must be able to be withdrawn from the area involved and concentrated upon some other object, which other object, from the standpoint of the evolution of social consciousness, means the adaptation of the individual to his surroundings i. e., to reality. The mode by which these changes of direction of the libido take place is the central problem of what is designated repression. Repression therefore has for its function the locking up of energy—of libido—until such time as it may be used at a higher i. e., socially permitted level. It serves as a basis for phantasy.

It cannot be too strongly insisted upon that this process of repression is going on all the time below the levels of consciousness in the developing child; and that by the age of five, which age limit as has already been expressed is purely arbitrary, the work of repression, so far as these primitive ego strivings are concerned, has resulted in creating a social animal. That is,

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antisocial trends can be satisfied in fantasy, rather than in reality. As Heraclitus has well said of the night dream, "*Is it not because we lie still and do not act, that we can indulge our fancy?*"

We shall see that the main work of analysis will ultimately center about the way in which the individual in his evolved actions, that is to say in his everyday conduct, still endeavors to follow out in an infantile manner, this fantasy method of obtaining power, i. e., satisfaction. To illustrate—it should be remembered that illustrations in the early part of an exposition of this kind are rather dangerous, just as too comprehensive an explanation of the unconscious mechanisms given to the patient is disadvantageous in the beginning of an analysis. A certain patient was discussing with me, after four or five months of analysis, the reasons why she persistently wore certain colors. Several dreams had revealed the infantile method of obtaining power chiefly through what we shall later discuss under the heading of the "prostitution phantasy." In the actual discussion of the prostitution fantasy it was brought out how for centuries the social organism has endeavored to exclude the actual prostitute as dangerous. In the illustration I was further called upon to elaborate upon the various disguises which unconscious prostitution had elaborated in higher and lower walks of life, and various trends were shown illustrating the various ingenious protective devices by which the high grade prostitute, so to speak, was still excluded from the social group in many subtle ways. This led to the statement on the part of the patient, that she failed to see wherein she was excluded in any way because of her unconscious fantasy. We were not dealing in any sense with conscious prostitution nor conscious exclusion (I need hardly add that the patient was of the highest social and ethical development), but we were directing our attention to the analysis of the color sensations (eye erotic) as a means for obtaining power and were endeavoring to show how, by the evolution of color sensation satisfactions, as shown in dress, this particular individual strove unconsciously for a sense of power. She strove not to be excluded from the attention of the community. In other words she utilized very striking colors to force herself upon the attention of her surroundings. The unconscious made sure that no one would fail to notice her. This we saw, in the discussion, was an unconscious attempt to insure the sense of power, which

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because of the likewise unconscious prostitution phantasy had resulted in a loss of power (i. e., unconscious sense of exclusion). The development of the color sense and the striking use of certain color combinations was therefore a protest on the part of the individual against the unexpressed and unconscious will of the community (reality principle of Freud), and the analysis resulted in showing to the patient how in her infantile period of development she had associated certain colors as representatives of the expression of power. We shall return to this later in the discussion of the dream.

Before dismissing the illustration entirely, however, I shall suggest that the use of "brown" by this particular patient was her present day esthetic evolution, which in the infantile one-to-five-year-old period had its origin in a fecal fantasy. The analysis was able to show step by step the evolution from the infantile sense of power obtained through the gastro-intestinal satisfactions to the present day use of a certain color.

When the patient thoroughly comprehends what one means by the libido, which is attached to the various parts of the body, just referred to; when there is conviction that practically all of our present activities have originated from these primitive sources, the next point to take up is the tracing of the mechanisms by which the present evolutions have come to be. In other words they are ready to ask if there are any guiding principles which will enable them to trace the pathway taken in the evolution of these infantile libido strivings?

This part of the outlining of the principles of psychoanalysis is not so difficult for the patient to comprehend, nor is one liable to be met with any opposition, because there is very little difference of opinion among educated people that the chief goal of living may be reduced to the carrying out of two principles, i. e., that of self preservation and of race perpetuation. There may be some difficulty in showing the individual that notwithstanding our firmly grounded belief that these are the two important principles underlying all manifestations of conduct, that there is a very definite conflict between them going on in the individual, and it also becomes an extremely fascinating part of the psychoanalytic doctrine to develop how the male and female act somewhat differently in this unconscious controversy.

For purposes of illustration, one can, in thought, carry oneself

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back many millions of years, when one might say it was decided which principle should obtain the ascendancy, i. e., that of self-preservation or that of race perpetuation; whether the individual should live for himself alone, or whether in the language of the Scriptures "he who would gain his life must lose it." In other words individual death was conquered by the process of reproduction. Immortality was gained by sacrifice. Biologists can explain why it is that the individual cell could not keep on growing indefinitely; that if life was to survive in any organic form, it could not do so solely by getting bigger. Notwithstanding all the expediencies that an organic thing could build up, so that the food supply would be carried to all parts of the organism, bigness as a principle reached its limit. Bigness was not the principle which would insure perpetuation. The geologist, who looks back over the record of the earth's long career, sees rise before him pictures of enormous animals and enormous plants. Size, however, as a form of power, gave way to other principles. In the sea today there float enormous *Laminarias,* single-celled plants, hundreds of feet long. They are mute survivals of an old biological principle; but it was not through this principle of "individuality" that the higher forms of life came to be. The principle of individual loss, or death, was only overcome by the principle of reproduction, and hence one may reason that of the two principles, i. e., self-preservation or race perpetuation, speaking from the unconscious point of view, that of race perpetuation was much more imperative than that of self preservation, and it conquered.

In the course of analysis this conflict between self-satisfaction, from a purely auto-erotic infantile point of view, and the larger one of race perpetuation, is constantly being presented. Auto-erotic symbolizations, be they epileptic fits, tics, hysterical conversions, or what not, are often the outward signs of the struggle and the effort to adjust these antagonistic claims.

Having settled this question for a patient, as to the meaning of these two principles, especially in their unconscious bearings rather than in their conscious ones, it now becomes important to show, or to trace how each principle is handled by each libido striving, or each partial libido trend; because it is highly important to have in mind that these partial trends are constantly working with both of these principles. For the sake of illustration let me put it in the form of questions. How does respira-

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tory libido handle the food question? How does skin libido handle the problem of feeding? How is hunger satisfied by the urethral libido? Wherein does muscular libido obtain its nutritive gratification, etc.? If each striving had its own way, the child would not live, because after all only one libido area receives any actual power (satisfaction) from food, i. e., the gastro-intestinal, speaking broadly. Auto-erotic satisfaction in the other areas must be repressed, and their individual libidos expressed in an attempt to obtain food through a transfer of their striving to some other area. Thus eye libido must learn that such and such an object is food; the muscle libido must be trained to know that such and such movements will obtain food; the ear libido must bend its energies to bargaining or to forms of adaptations that will make the others adaptive. If in the course of bargaining, for instance, there is urgent need for bladder or other form of auto-erotic satisfaction, the same must be suppressed for the main goal, and the gastro-intestinal power symbol satisfied.

The analysis of the various modes of repression of partial libido trends to bring about an adaptation to the self-preservation combined libido is very incomplete in psychoanalytic literature. Much attention has been devoted to what we have already seen is really the more important of the combined libido trends, i. e., race perpetuation or what might more narrowly be termed the sexual impulse. It is for this reason that one should pay particular attention to the development of the idea of the nutritive instinct in man, notwithstanding its secondary importance, for a great many of the resistances concerning money lie in this field.

We have therefore chosen to pass immediately to the consideration of the mode of analysis of the reproductive instinct. The first formulation of general principles here is what has been termed by Freud, the Œdipus Complex.

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CHAPTER IV

The Œdipus Hypothesis as a Psychological Measuring Unit. Its Evolution and Final Stabilization as a Social Force

It has been my experience to be frequently asked by physicians, "What do you mean by the Œdipus Complex?" For a long time I was unable to answer the question, largely because it was asked in jest, but further by reason of the fact that it was impossible for me to phrase a reply in a way which I felt would be satisfactory to my questioner. When asked partly in jest I would frequently reply, "What is the Ehrlich side-chain theory?" This is an apparent evasion. To others I have said, "It is a mode of explaining why any individual finds it difficult to break away from old ways of doing things in order to acquire new and better ones." Again to others, my reply has been, "It is a restatement of the world-old struggle of conservatism versus progressivism." Such a method of handling what Freud has termed the "root-complex" of the neurosis will hardly suffice. Yet after all the answers just enumerated may be found satisfactory if elaborated.

In the first place the Œdipus Complex is solely an hypothesis, just as the Ehrlich side-chain theory is an hypothesis. It is a formulation to be used to handle the facts. Instead of terming it only the "root-complex" of the neurosis, however, I purpose giving it a much broader basis. It can be used as a unit of measurement for all psychological situations, not only for those "variations which are only perceived when they become great or inconvenient," and hence called abnormal, but for every so-called normal psychical activity as well. Even the tyro in science knows that the idea "normal" is a pure bugaboo. Normal means average if it means anything.

Just as we use a foot-rule to measure all space relations; a unit of time for all time relations, so the Œdipus hypothesis can be used as a unit for the comprehending of psychical situations. It is the only unit which has proved itself valid for all psychical phenomena, be they what intellectualists call normal or abnormal.

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I think I may say that practically every philosophical hypothesis, save pragmatism, has neglected what are called pathological data, overlooking the fact that pathological does not mean of a different, qualitative, nature, but simply a variant which must be measured by the same standards as that which is called normal.

In this connection one may again turn to that ancient sophist Protagoras for the first statement of a sound pragmatism. In his dialogue with Morosophus on the perception of truth, Protagoras closes an eloquent peroration with the question: "Do you know Xanthias the son of Glaucus?"

Morosophus: Yes, but he seemed to me a very *ordinary* man and quite unfit to aid in such inquiries.

Protagoras: To me he seemed quite wonderful and a great proof of the truth I have maintained. For the wretch was actually unable to distinguish red from green, the color of the grass from that of blood! You may imagine how he dressed, and how his taste was derided. But it was his eye, and not his taste, that was at fault. I questioned him closely and am sure he could not help it. He simply saw colors differently. How and why I was not able to make out. But it was from his case and others like it, but less startling, that I learned that truth and reality are to each man what appears to him. For the differences, I am sure, exist, even though they are not noticed unless they are very great and inconvenient.

Morosophus: But surely Xanthias was diseased, and his judgments about colors are of no more importance than those of a madman.

Protagoras: You do not get rid of the difficulty by calling it madness and disease. And how would you define the essential nature of madness and disease?

Morosophus: I am sure I do not know. You should ask Asklepios.

To which Protagoras remarks: "Ah! he is one of those gods I have never been able to meet."

One does not get rid of difficulties by calling them abnormal. Giving them this appellation does not explain them. Hence the Œdipus hypothesis may be utilized to analyze everybody's activities, not those of the neurotic alone. To say that only the neurotic has to deal with an Œdipus fantasy is absurd; everybody does: but how? The way the individual handles his Œdipus fantasy; how far it has evolved away from its infantile stages,

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this is what determines whether he shall be termed neurotic or not, normal or abnormal.

What then is the Œdipus hypothesis? For the sake of historical completeness it may be recalled that it received its name from the drama of Œdipus Rex, a mythological theme in great favor among the Greeks of the Epic period. The psychoanalyst should read the various renderings of it. It is fully treated psychoanalytically in "The Myth of the Birth of the Hero"[1] by Rank, also in the same author's "Inzest Motive," both of which works have been mentioned.

To the philistine the story simply means that Œdipus killed his father and married his mother; but it implies infinitely more than this. It is the psychical elaboration of an enormously important part of a biological instinct. It is the conversion of energy into symbolic activities that at lower social stages was expended at physical levels.

How this evolution towards the conversion of energy into symbolic form took place cannot be entered into fully here.

Freud has shown in his "Three Contributions to the Theory of Sex"[2] that on rigid analysis the instinct of reproduction reduces itself to the choice of a proper *object*—the object choice; and of the proper *aim*, i. e., the reproductive act. To satisfy the first requirement an individual of the opposite sex must be the libido object. This sounds so trite as to hardly require stating, yet the merest superficial acquaintance with human as well as infrahuman activities reveals how much variation of attraction exists in a direction away from the consciously obvious heterosexual object.

The second requirement is successfully met with when the partial libido trends already discussed on page 40, become united to successfully establish the primacy of the genital zone. The variations from this equally obvious goal are also so frequent that the observant inquirer is struck with amazement at the various faulty adjustments of what is so frequently considered a "natural" function.

We are now speaking solely of mechanisms which have been laid down for many million years and which are instinctively and unconsciously forming, but, it must be recalled, they are extremely variable in their external modifications when it comes

[1] Monograph Series, No. 18.

[2] Second English edition from third German edition, 1916.

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to their permitted socially-controlled and consciously-guided activities.

It is to this broad reproductive instinct, in all of its conscious and unconscious manifestations, that Freud has applied the term sexual. In this present volume on the Technique of Psychoanalysis, *sexual* means any human contact actual or symbolic by means of any sensory area with the object of the same or of the opposite sex, which has *productive creation* for its *purpose,* be it concretely in the form of a child, or symbolically as an invention, artistic production, or other type of mutually creative product. It does not apply to those contacts which have purely nutritive or self-preservation instinct behind it. And it does not apply solely to genital contacts.

Thus it might be stated, though such a statement might seem to be paradoxical, that prostitution is not really sexual. It has come to be stigmatized because it utilizes the love principle for purposes of gain, and stands as a symbol of the destruction of society rather than that of its upbuilding. If in biblical phrases, "the love of money is the root of all evil" then prostitution symbolizes that root, and as later will be pointed out it represents in its pure type chiefly an infantile anal erotic complex. It is a satisfaction of unconscious hate rather than of love in terms of the Œdipus hypothesis.

The Œdipus hypothesis then attempts to establish some criterion, or group of criteria, by which human conduct may be valued as it looks forward to ultimate social or pragmatic truth, or goodness. It first directs attention to the biological trend of getting away from the type represented by the parent of the same sex, to a getting toward the type represented by the parent of the opposite sex. Without this biological direction of libido, no concrete social structure is possible. It is not father hate and mother love for the boy, and vice versa for the girl, in terms of conscious psychology, as is so often said by the critics. The Œdipus hypothesis has nothing whatever to do with conscious psychology, any more than the chemical formulæ of the fats in butter have to do with milking a cow. A knowledge of these formulæ for fats may prove the ultimate basis for the valuation of a herd of cows, just as the application of the Œdipus formulæ will permit of the comprehension of the acts of a family and thus determine their social value.

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So-called shrewd practical observers may make excellent estimates of cows as well as of citizens, but when it comes to correcting the mistakes, in order to get shrewder and more practical observations, some measuring instruments are needed. Hence psychoanalysis utilizes the Œdipus instrument of precision.

In obtaining the full family history the analyst is getting the material from which a proper estimate of the evolution of the patient's psyche may be gathered. This it must be remembered is the conscious estimate of the patient's relations to the members of his family.

These conscious attitudes to the members of the family group are not, however, invariable criteria of his more fundamental unconscious ones, yet they are of great importance in affording clues to early infantile repressions. The family is the first training camp, as it were, for the child's activities in gaining his social bearings. His later attitude toward men, women and things is patterned largely after his infantile models. We can here trace the workings of the Œdipus formula in its gradual evolution away from phantasy to reality.

This formula has shown that the boy must have certain attitudes toward others of the same sex, mostly antagonisms, from the primitive wellspring of energy, and attractions toward all others of an opposite sex.

A young woman to whom, in the early days of my psychoanalytic work, I had announced the Œdipus principle rather crudely, responded with much heat, "But I have always loved my mother, and we three sisters are devotedly attached to one another. The idea of rivalry among us sisters is impossible."

"Yes, yes," I said, "that is true, but you are speaking of your conscious attitudes. We will not comprehend the pain between your shoulder blades by accepting the conscious attitude as the whole story, we must see what is on the other side of the picture."

It did not take long, by the study of the unconscious processes, to find that the pain between the shoulder blades was the symbol of a "stab in the back" from her, consciously, most loved sister. Behind it lay concealed a very intense rivalry, a rivalry which, as will be seen, is a necessary part of the working out of the Œdipus idea, and one which, it may be maintained, is a necessary aspect of a comprehensive biological scheme for social

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evolution. The sister was really trying to steal her sweetheart. She was "stabbing her in the back."

This biological scheme has been stressed particularly by Rank in his study on the "Myth of the Birth of the Hero" and he has called it the "family neurotic romance."[8] It is a universal phenomenon, and must be worked out with each patient. They must see for themselves how they have evolved their own dream of power in opposition to all the other members of the family.

I am assuming that Rank's fundamental study will be read by one interested in mastering the technique of psychoanalysis, yet it belongs in this place in the development of the Œdipus hypothesis and a short résumé of the chief principles involved is desirable.

Every child is an egoist. It has been seen why this must be so in order that he may live at all. It is equally obvious that if social adaptation is to take place, he cannot remain one, at least not at an infantile level. Every child, in his egocentric fashion, constructs for himself therefore his little hero-myth. The will for power, in danger, thrusts in a phantasy substitute and thus aids the work of repression, as we have already discussed. Inasmuch as the stages through which any one individual child may go are usually much abbreviated, and difficult of interpretation by himself, of himself most of all—that is why most of us deny we have ever had such fancies—Rank turned to a study of the hero myths of the world, and by a comparative study of these ancient sagas, was able to reconstruct what goes on in every child probably, although, for many, such processes are hidden. The evolutionary principle of recapitulation again does service in the understanding of these psychical structures.

The standard principle for these ancient hero-myths is formulated as follows: "The hero is the child of most distinguished parents; usually the son of a king (with us some important personage, governor, millionaire, or what not). His origin is preceded by difficulties, such as continence, or prolonged barrenness, or secret union of the parents, due to external prohibitions or obstacles. During the pregnancy, or antedating the same, there is a prophecy, in form of a dream, or an oracle, cautioning against his birth, and usually threatening danger to the father or to his representative. As a rule he is surrendered to the water, in a box. He is then saved by animals, or by lowly people (shep-

[8] Monograph Series, No. 18.

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herds), and is suckled by a female animal, or by a humble woman. After he has grown up he finds his distinguished parents, in a highly versatile manner, takes his revenge upon his father, on the one hand, is acknowledged on the other, and finally achieves rank and honors."

This is the child phantasy of the race, in highly condensed form. Even in the mythological stories themselves, this ground pattern, as it were, is departed from, and it is therefore conceivable that one rarely finds it in pure form at the present time, save in some psychotics, particularly in the group which, as defined by Bleuler and Jung, is termed schizophrenia, or dementia præcox. Here the ancient formula is repeated true to type. In minor degrees and in the greatest variety of disguises the psychoneurotic follows out parts of the program. As Freud has pointed out these individuals remain children or infantile in certain aspects of their strivings; they are close to the unconscious. As Rank has put it, "The fancies of neurotics are, as it were, the uniformly exaggerated reproductions of the childish imaginings." But as we have so often remarked, these are closed to the ordinary modes of investigation and the psychoanalytic method has become the best method of reaching them at the present time.

Rank has sketched the chief outlines of the biological need for getting away from the parents. "Except ye leave father and mother, ye shall not enter the kingdom of heaven," I conceive to be a much earlier statement of the same situation. In the realm of plant life Darwin's penetrating studies that showed the values of cross-fertilization is collateral evidence in a realm of biological activities far below man, and the whole biological scheme of things reveals the ceaseless experiments that nature goes through with in the hope that advanced types may result. Just what particular evolutionary formula will appeal to the analyst or analyzed, should one be invoked at all, whether it smacks of Neodarwinism, Neolamarckianism, or follows out the Mendelian principle, or De Vries's Mutation hypothesis, not to mention others, is absolutely immaterial in the development of the general idea. If the patient should be an out and out opponent to any evolutionary hypothesis at all, then the whole psychoanalytic scheme will have little value to him. In general, I assume that the analyst has a working knowledge of the general biological hypotheses concerning evolution and heredity.

In the human family, psychoanalysis emphasizes, as Rank

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has phrased it, "the detachment of the growing individual from the authority of the parents is one of the most necessary, but also one of the most painful achievements of evolution. It is absolutely necessary for this detachment to take place." Analysis shows how the psychoneurotic is endeavoring to accomplish the task and also indicates how the healthier individual has really accomplished it in various ways. The manner of cure, or the rationale of psychoanalysis, how it acts, may be very definitely demonstrated in the tracing of the individual's growing independence from his parental complexes.

To still further illustrate this absolutely essential separation I not infrequently use a simple illustration. Putting the problem of the apple tree, I ask, "What would happen if all the seeds should attempt to grow under the parent tree?" It is an easy step from this illustration to a discussion of the thousands of devices which plants and animals have elaborated to make sure of the dispersal of their seeds or offspring. The ingenious clinging seeds that fasten to one's clothes or to the fur of animals, the various winged seeds that fly like the thistledown, or dandelion, those that float, or those that pass through the intestines of animals, the devices are legion and the ingenuity marvellous.[4] Parent and child must be separated.

"Social progress—speaking now of higher forms—is essentially based upon this opposition of the two generations," writes Rank, who then points out how the failure to get away from the parent is paramount to a neurosis.

"For the young child, the parents are in the first place the sole authority, and the source of all faith. To resemble them, *i. e.*, the progenitor of the same sex; to grow up like father or mother, this is the most intense and portentous wish of the child's early years. Progressive intellectual development naturally brings it about that the child gradually becomes acquainted with the category to which the parents belong. Other parents become known to the child, who compares these with his own, and thereby becomes justified in doubting the incomparability and uniqueness with which he had invested them. Trifling occurrences in the life of the child, which induce a mood of dissatisfaction, lead up to a criticism of the parents, and the gathering conviction that other parents are preferable in certain ways, is utilized for this

[4] Consult Koerner von Marilaun, Natural History of Plants; Fabre, Souvenirs Entomologiques.

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attitude of the child toward the parents. From the psychology of the neuroses, we have learned that very intense emotions of sexual rivalry are also involved in this connection. The causative factor evidently is the feeling of being neglected. Opportunities arise only too frequently when the child is neglected, or at least feels himself negected, when he misses the entire love of the parents, or at least regrets having to share the same with the other children of the family. The feeling that one's own inclinations are not entirely reciprocated seeks its relief in the idea—often consciously remembered from very early years—of being a stepchild, or an adopted child. Many persons who have not become neurotics, very frequently remember occasions of this kind, when the hostile behavior of parents was interpreted and reciprocated by them in this fashion, usually under the influence of story books. The influence of sex is already evident, in so far as the boy shows a far greater tendency to harbor hostile feelings against his father than his mother, with a much stronger inclination to emancipate himself from the father than from the mother. The imaginative faculty of girls is possibly much less active in this respect. These consciously remembered psychic emotions of the years of childhood supply the factor which permits the interpretation of the myth. What is not often consciously remembered, but can almost invariably be demonstrated through psychoanalysis, is the next stage in the development of this incipient alienation from the parents, which may be designated by the term *Family Romance of Neurotics*. The essence of neurosis, and of all higher mental qualifications, comprises a special activity of the imagination which is primarily manifested in the play of the child, and which from about the period preceding puberty takes hold of the theme of the family relations. A characteristic example of this special imaginative faculty is represented by the familiar day dreams, which are continued until long after puberty. Accurate observation of these day dreams shows that they serve for fulfilment of wishes, for the righting of life, and that they have two essential objects, one erotic, the other of an ambitious nature (usually with the erotic factor concealed therein). About the time in question the child's imagination is engaged upon the task of getting rid of the parents, who are now despised and are as a rule to be supplanted by others of a higher social rank. The child utilizes an accidental coincidence of actual happenings (meetings with the lord of the

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manor, or the proprietor of the estate, in the country; with the reigning prince, in the city; in the United States with some great statesman, millionaire). Accidental occurrences of this kind arouse the child's envy, and this finds its expression in fancy fabrics[8] which replace the two parents by others of a higher rank. The technical elaboration of these two imaginings, which, of course, by this time have become conscious, depends upon the child's adroitness, and also upon the material at his disposal. It likewise enters into consideration, if these fancies are elaborated with more or less claim to plausibility. This stage is reached at a time when the child is still lacking all knowledge of the sexual conditions of descent. With the added knowledge of the manifold sexual relations of father and mother; with the child's realization of the fact that the father is always uncertain, whereas the mother is very certain—the family romance undergoes a peculiar restriction; it is satisfied with ennobling the father, while the descent from the mother is no longer questioned, but accepted as an unalterable fact. The second (or sexual) stage of the family romance is moreover supported by another motive, which did not exist in the first or asexual stage. Knowledge of sexual matters gives rise to the tendency of picturing erotic situations and relations, impelled by the pleasurable emotion of placing the mother, or the subject of the greatest sexual curiosity, in the situation of secret unfaithfulness and clandestine love affairs. In this way the primary or asexual fantasies are raised to the standard of the improved later understanding.

"The motive of revenge and retaliation, which was originally in the front, is again evident. These neurotic children are mostly those who were punished by the parents, to break them of bad sexual habits, and they take their revenge upon their parents by their imaginings. The younger children of a family are particularly inclined to deprive their predecessors of their advantage by fables of this kind (exactly as in the intrigues of history). Frequently they do not hesitate in crediting the mother with as many love affairs as there are rivals. An interesting variation of this family romance restores the legitimacy of the plotting hero himself, while the other children are disposed

[8] Compare Freud, Hysterical Fancies, and Their Relation to Bisexuality, with references to the literature on this subject. This contribution is contained in the second series of the Collection of Short Articles on the Neurosis Doctrine, Vienna and Leipsig, 1909.

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of in this way as illegitimate. The family romance may be governed besides by a special interest, all sorts of inclinations being met by its adaptability and variegated character. The little romancer gets rid in this fashion, for example, of the kinship of a sister, who may have attracted him sexually.

"Those who turn aside with horror from this corruption of the child mind, or perhaps actually contest the possibility of such matters, should note that all these apparently hostile imaginings have not such a very bad significance after all, and that the original affection of the child for his parents is still preserved under their thin disguise. The faithlessness and ingratitude on the part of the child are only apparent, for on investigating in detail the most common of these romantic fancies, namely the substitution of both parents, or of the father alone, by more exalted personages—the discovery will be made that these new and highborn parents are invested throughout with the qualities which are derived from real memories of the true lowly parents, so that the child does not actually remove his father but exalts him. *The entire endeavor to replace the real father by a more distinguished one is merely the expression of the child's longing for the vanished happy time, when his father still appeared to be the strongest and greatest man, and the mother seemed the dearest and most beautiful woman.*

"The child turns away from the father, as he now knows him, to the father in whom he believed in his earlier years, his imagination being in truth only the expression of regret for this happy time having passed away. Thus the over-valuation of the earliest years of childhood again claims its own in these fancies.[6] An interesting contribution to this subject is furnished by the study of the dreams. Dream interpretation teaches that even in later years, in the dreams of the emperor or the empress, these princely persons stand for the father and mother. Thus the infantile over-valuation of the parents is still preserved in the dream of the normal adult.

"As we proceed to fit the preceding features into our scheme, we feel justified in analogizing the ego of the child with the hero of the myth, in view of the unanimous tendency of family romances and hero myths; keeping in mind that the myth throughout reveals an endeavor to get rid of the parents, and that the same wish arises in the phantasies of the individual child at the time when it is trying to establish its personal independence.

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The ego in the child behaves in this respect like the hero of the myth, and as a matter of fact, the hero should always be interpreted merely as a collective ego, which is equipped with all the excellences. In a similar manner, the hero in personal poetic fiction usually represents the poet himself, or at least one side of his character."

The beginner who, for the first time, approaches these mechanisms of getting away from the parents, has really only the faintest conception how the scheme works in everyday life. I must reiterate to him that he constantly keep in mind all of the partial libido trends. Each must be followed out in its most minute series of transformations, and the patient gradually sees for himself, in some special form of conduct, such as love for certain forms of play, nutrition customs, likes and dislikes of all kinds, just how successful or not his getting away from his infantile attachments has been. Every infantile attachment means locked-up energy, which cannot be used for useful work. They are the "messengers from the unconscious," which Bergson speaks of, "which escaping through the half open door, remind us of what we are dragging behind us unawares."

I wish to illustrate these points by a partial statement of an actual history and by means of a diagram:

This patient was a young man of 28 years of age, of good family. His father was a successful business man. He had two brothers, older than himself, and two sisters living; one sister had died. He began to drink at sixteen, smoked since he was ten. His father was a drinking man, at times excessively so, also one brother. He went through school and entered college but did not persist, as his gradually increased drinking bouts interrupted the discipline, of which there was little at home. He went into business but did not apply himself particularly. He was a charming, good-looking, "gentleman's" son with plenty of money.

His drinking bouts were becoming more or less continuous. He would be feeling perfectly well, would take a drink, usually of whiskey, then another, and from that time nothing short of a strait-jacket could hold him; he was suave and courteous and convincing if he had his own way, but he would be a very rough

[6] For the idealizing of the parents by the children, compare Maeder's comments (*Jahr. f. Psychoanalyse*, p. 152, and *Centralblatt f. Psychoanalyse*, I, p. 51), on Varendonk's essay, Les idéals d'enfant, Tome VII, 1908.

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customer if opposed. After twelve, twenty-four, thirty-six or sometimes seventy-two hours or more of this he would be a wreck and would have to be taken care of. Sometimes the bout would last two or three weeks. They were becoming frequent, and his last bout, before I saw him, was attended with meningeal symptoms and signs of general toxemia, mild jaundice, etc.

The picture is familiar to many. I do not intend to detail the analysis, I shall only utilize some of the facts revealed to show, in part, what the whole thing meant, in terms of the working out of the Œdipus hypothesis, the family neurotic romance, and the later phase of this same situation, namely narcissism.

Analysis uncovered a great deal of material, but I wish only to direct attention to this patient's eating habits by way of illustrating the meaning of what this chapter seeks to emphasize, namely the failure to develop away from the infantile manner of handling the Œdipus phantasy.

Asking him one day what he ate for breakfast he said, "Sausages, waffles and maple syrup," and for supper? "I don't remember."

And yesterday for breakfast? "Sausages, waffles and maple syrup." He could not remember what else he had eaten. Every morning he ate the same breakfast, and had done so for fifteen years or more. He ate no vegetables, except potatoes; he ate a variety of meats.

Now what has this to do with the Œdipus hypothesis?

Before we go further with the discussion let me put in a diagrammatic form what is the general scheme I am after. I shall again utilize the diagram (modified in circular form) that has already been used to show the first steps in libido distribution following birth.[7] It is not meant to show every detail in the evolution of the partial libido trends—it is, as was the preceding diagram, only suggestive.

All of our present-day activities, which manifest themselves in the various life contacts, may for our purpose be represented by a circle. At the periphery we may arrange the conscious acts of daily life. In this diagram the libido area distributions are arbitrarily represented by six sectors, showing the first distributions, *i. e.*, the partial libido trends, already discussed (see p. 40). I have only partially elaborated one sector, *i. e.*, the nutritive sector, since I am engaged in placing the dietary habits of the

[7] Page 40.

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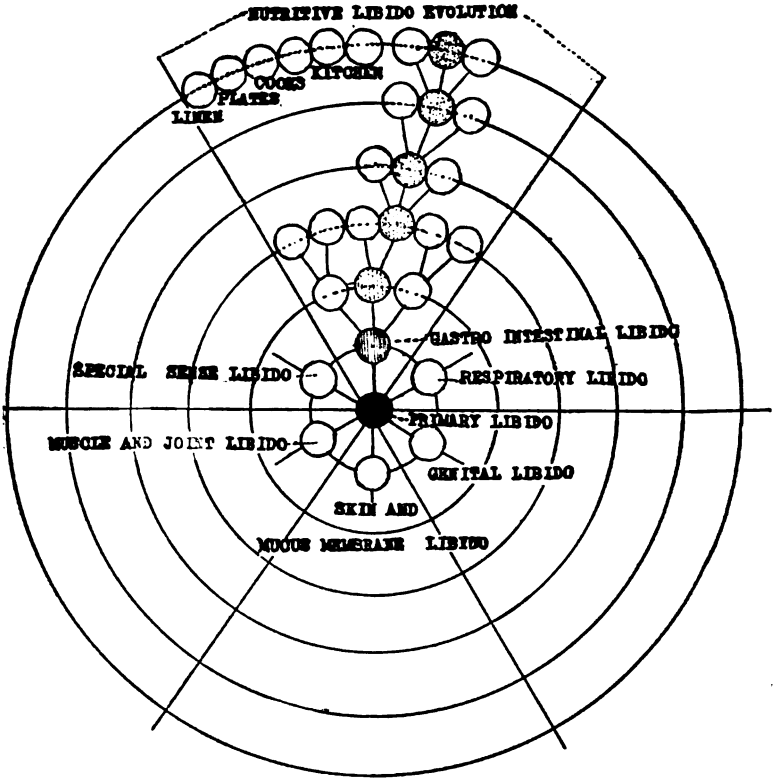
patient under discussion somewhere in the scheme. If the discussion should have turned on why a patient ended his sentences in a little giggle, or another toyed with a button on his coat most of the time, the particular evolution might have been shown in



Diagrammatic suggestion of the evolution of the libido trends. The path taken by the patient's nutritive interests, and hence his sympathetic contacts (social evolution particularly of his sociability) have become narrowed to a persistent restricted and narrow diet, the meaning for which, in his individual case, meant failure to get away from the parents, *i. e.*, in the unconscious sense of the Œdipus formula. The diagram suggests the line taken by this in the slightly shaded circles.

the respiratory, or the skin sectors, which for the purposes of this illustration are here left blank. I am engaged in placing this particular patient's partial libido trends, as far as one particular series of acts are concerned, in relation to the Œdipus concept.

This boy's first nutritive libido concerned itself with his mother's breast. Milk was his sole food. This is diagram-

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matically shown on the first circle, in which the initial partial libido trends are represented. From here on, it may be inferred, the evolution of man's nutritive interests becomes more and more complex, until at the stage of evolved manhood, the nutritive libido occupies a large part of man's interests. In the U. S. Census for 1900, it is estimated that one third of the adult population of the U. S., some twenty million at least, make their living in pursuits which contribute directly to the nutritive libido. Here we see man's interests, into which active energy goes, concerning itself with pots and pans, agricultural instruments, crops, etc. I need not complete the picture. It is so obvious. Yet when we come to discuss the patient's nutritive libido we find a very striking fact, that of its monotony. It has not evolved. He has eaten the same breakfast for the past sixteen years, eats no vegetables save potatoes and several meats. He has no interest in foods outside of this limited dietary. If I should attempt to place his nutritive libido stage of evolution I would place it at an infantile level, say arbitrarily on the second circle, which is here represented. From this point on to the present it has not undergone any modification, as has been schematically shown. I might say all sociability, so far as these nutritive interests are concerned, is thus restricted.

Now, turning to the mother-father relationships, the first fact that strikes one is its failure to branch out. It remains closer to a monotonous infantile food—milk—and fails to show a wider, richer dietary. I am not generalizing about the significance of a limited dietary for all people. Every tub stands on its own bottom. Here I am simply taking a particular case and seeing what it means for this particular individual. It represents, in terms of the Œdipus concept, an infantile attachment to the mother. It is a way by which he unconsciously and symbolically hangs on to the mother. Let me now add that milk is also taken instead of coffee, tea or cocoa. Free associations, with milk, concerning which we shall speak, brings the patient directly to his mother. Interesting also free associations on sausages show that he prefers small ones, thin ones, and mother's "nipple" turns up in his associations, as well as the word "penis."

Associations to "waffles," also, brings us to "nipples," "teats," to the "irons in which they are cooked"—"colored woman's breasts," "pigs' tits," were some of the free associations.

I shall not give further details to show unconscious associa-

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tions establishing the relationships between the infantile mother phantasy and the dietary customs making up this monotonous breakfast.

We have seen, however, that the Œdipus hypothesis involves two contrasting situations, one of unconscious attachment to the parent image of the opposite sex, the other connoted by the unconscious antagonism to the father-brother image. There is plenty of evidence to show the unconscious desire to get rid of his father and brother in his drinking bouts. It is further extremely valuable to note that this diet also represents a "castration motive," meaning symbolically the overcoming of the father. Furthermore, the only other feature of his diet, namely his free choice of meats, has an intricate motivation. For him, as for many children, meats and vegetables fall into the strong and weak group respectively. Animism so regards them, and the young human passes through this psychological animistic phase. Many people, as we know, never get away from their crude animistic notions regarding foods, and a study of these makes many dietary faddisms comprehensible and fascinating. Meats are to make him strong and powerful. They therefore will help him in overcoming his father, or his representative, his older brother.

I have very rapidly sketched some of the salient points in the elucidation of the food habits of this patient and wish to stress more particularly their failure to evolve and therefore the gap in this individual's interests which is the center of endeavor for 25 per cent. of all of the people he meets. I might say for purposes of illustration, that he thus cuts himself out of sympathetic contact and interest from one quarter of his entire social environment by this simple failure of development—by this unconscious utilization of the Œdipus fantasy as seen in his dietary customs. He limits thereby a very important factor in the freeing himself from the limited family group to enter the larger social groups, namely the factor of sociability as it is termed.

I need not go on to say that a similar failure to develop along a number of other libido channels has contracted his sympathetic social contacts, i. e., his sociability, down to a minimum. This is a part of the motivation for his drinking. It aids him to get away from the consciousness of his inferiority. But I only started out to give a concrete example of how the Œdipus hypothesis is applicable to a specific bit of conduct.

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I shall only add that every bit of conduct, every taste, or inclination, like or dislike, is capable of a similar analysis, and the analytic technique aids the patient to see how his everyday acts have come to have the value and significance that they have.

When the subject of the utilization of the dream is taken up we shall see that the evidence is overwhelming with reference to the constant activity of the Œdipus phantasy.

We then return to the point from which we started, that the Œdipus hypothesis is utilized as a sort of measuring rod to determine the grade of evolution of psychological activities, looking forward to ultimate social values. The analysis of one's acts shows, schematically speaking, how far on the circles of evolution the particular act may be placed, whether it remains an infantile fantasy way of obtaining satisfaction from the mother-father attachment or rejection (according to sex) or a grown up sublimation way which is socially, and hence also individually valuable. Identically the same energy is utilized, but "by their fruits shall ye know them."

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CHAPTER V

Transference and its Dynamics, the Basis of Social Integration and the Lever in Psychoanalysis

The dynamics of the entire psychoanalytic situation and the possibilities of cure by its application lie in the correct management of the transference. Inasmuch as these notes have been planned for the beginner in psychoanalysis it is desirable to have a fairly clear idea of what is meant by transference.

There is no adequate definition of transference. In fact the whole attitude of this series of articles is one distinctly opposed to the utilization of definitions. Definitions are too apt to be sterile condensations of the meaning of *words* rather than dynamic principles for the understanding of *things*. Hence I shall not try to define transference, I shall attempt to describe it.

In order to do this I must again remind the beginning analyst what we have considered to be the chief goal in the libido striving. Libido is considered in this series of articles as the living vital energy, which, flowing into various forms, as Bergson has so well expressed it, may be compared to a string of pearls. The organized living forms of plants and animals are comparable to condensations at different points along the string. We term the latest crystallization man, the next, possibly, shall we say, the superman, not that of Nietsche, but the true superman, the futuristic, socialistic ideal, more closely allied to the symbolic Christian ideal than any as yet reached. In its endeavor to make the superman, this libido utilizes the principle of reproduction. It may thus possibly reach its goal, physical immortality. We are considering human problems for human beings and are not interested in questions that have no human interests. Hence whether there *is* a life after death or *not* we shall not discuss. Why man *wishes* one however we shall take up. The presence or absence of the *fact* is of little significance. For humans it has no solution; but the *wish* is essentially human and occupies the very focus of the problem we have set out to comprehend in this chapter.

Our formulations have taken us thus far to posit the instincts of reproduction and self-preservation as the essential and fundamental symbols underlying the process of living. From this point of view

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all other so-called instincts are only combinations, amplifications or partial elaborations of these. In their last analysis they are reducible to these. In many recent works on character traits, etc., a number of instincts have been described. Thus in Macdougall's interesting Introduction to Social Psychology and in Shand's Foundations of Character, one finds that there are the instincts of fear, repulsion, pugnacity, curiosity, self-abasement, self-assertion tenderness, reproduction, gregariousness, acquisitiveness, constructiveness, hunger, sympathy, suggestion, play and imitation. While it may be thoroughly practical to use these instinct definitions in those settings for which they are adapted, yet for the psychoanalyst they are compounds, capable of reduction to the fundamentals which have been recognized for centuries. Of all recent writers Adler in his Nervous Character has resolved them nearer their original well-spring than any others.

If then concrete immortality is the goal of the libido striving, which is reached either directly and foremostly through the birth of children and secondarily through building up of social structures and all that goes to make life worth living, then it is extremely simple to comprehend that the symbol of power to bring this about should be expressed, for the adult, in terms of the primacy of the genital zones. Potency becomes the guiding ideal. The direct opposite of personal immortality is death. Desire as a constructive forward push of the libido is therefore symbolized as potency. Fear becomes the opposing symbol of impotency and is likened to death.

In this sense then one says that through the study of desire and fear one can arrive at a complete comprehension of the motives of life. This we do not believe to be true, because as we have already seen, desire and fear are evolutions out of simpler components. It has been shown particularly by Jung that before the period of the development of the ego consciousness of the child—arbitrarily here considered as occurring about the age of 5—there is no desire goal as a whole. This is the period of the partial libido trends, discussed on page 40.

If this is true for desire, it is probably true for fear. This attitude is completely set forth by Stanley Hall,[1] who says, "Fear is the anticipation of pain. For those forms of life capable of fear this anticipation is not prevision but only a highly generalized fore-

[1] Synthetic Genetic Study of Fear, Am. Jour. Psychology, April, 1914, XXV, pp. 149–200.

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feeling, itself unpleasant, that a yet more painful state impends. The will to live, the *élan vital,* is more or less checked in its momentum or narrowed in its range by some kind of intimation that it may be still further held up. This protensive or futuristic attitude or orientation toward a pejoristic state is the specific quale of the psychic condition called fear. Psychoanalytically it is a primitive *Anlage* of futurity and it is the most stimulating and vivid of all its forms of presentation. In fear the future dominates the present and gives it a new significance in addition to its own, and but for fear pain could do but little of its prodigious educative work in the animal world. Fear is thus the chief paradigm of psychic prolepsis as well as the chief spur of psychic evolution. The *Einstellung* it motivates to the 'what next' and the 'about to be' may become, second only to present pain, the most intense of all psychic experiences. This power to fore-feel pain, although not unanalyzable genetically, is nevertheless primary, unitary and unique enough to be considered practically, if not scientifically, as indeed it always has been popularly, as a primary category of the emotional or affective life. In its most generic form it is identical in all stages of animal life, for the function of pain-anticipation is common to and underlies all its innumerable differentiations as to objects, its degrees, physiological concomitants and modes of expression.

"Fear has only one genetic presupposition and that is some experience, individual or racial, up and down the algedonic scale. There must have been suffering and this must have left some trace. Here, then, we have germs of both memory and recollection, however rudimentary and unconscious. From this point of view we may further define fear as revived traces or engrams of past pains in prospect of passing over into re-realization which latter is normally more intense than its merely reproduced forms. If pain had not been felt it could not be anticipated, hence the condition precedent of fear is some kind of registration (whether transmissible by heredity from forbears or individually acquired we shall discuss later) and some degree of revival of these vestings. Thus fear involves the past as we have seen it does the future. Without conservation of past experiences there could be no fear, nor could there be if the phosphorescence of the traces left by the past were more painful than their dreaded reinstatement itself, which latter case indeed occurs, but only in certain psychalgias in which the pain of the present moment is so excruciating that any presentiment of a greater one is impossible. In a general sense, then, and subject

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to many specific limitations, we may say that both the intensity and variety of fear depend on the intensity and variety of the pains that have before been felt. Too much suffering tends to timidity, too little exposes to avoidable dangers without either warnings or defenses, and the optimum between these extremes, which varies greatly with individuals, will some day be an attainable and perhaps individually prescribed goal of orthogenesis as it already is of psychotherapy. Not only are herbivora and all creatures being preyed upon timid and carnivora relatively fearless, but many phobias are the direct result of shocks and we may say in general that the first fear in the world could only come after a preceding pain."

"In fact fear is intensely dynamogenic and also inhibitive. The prospect of actual pain puts to life the question of its very survival or extinction, complete or partial. Something bad has begun which is prelusive of something worse, but this worse must if possible be avoided. So feeling must pass over into doing. The narrowing of the pleasure field, or its conversion into its opposite, makes the strongest of all appeals to the efferent tracts to energize to their uttermost. Much conduct, behavior, many habits and even motility itself throughout the animal world might be described as more or less organized pain-fugues which are correlates of the pleasure-tropisms. Here belong all, perhaps even physiological, protective and defensive phenomena and methods of escape from enemies or the perils of the environment which are essential for survival and are precious because wrought out at great cost and through countless generations. In the life of the individual, and still more in that of the race, the way of orthogenesis is relatively straight and narrow and is the result of more failures than successes in the trial and error processes of evolution."

Thus there arises that thanatophobia, that fear of death, which in the course of thousands of years of evolution has given rise to the physician—to medicine in the large.

We may without thinking say that the physician's function is to cure the sick, prevent sickness, etc., etc. This is the naïve conception of the conscious. The physician is much more than this in the unconscious life of the community. If it were not so there would be no problem of transference, and no need for any comprehension for the whys and wherefores of the misery and suffering found in an as yet very imperfect world.

The physician is a projected wish of the individual's own un-

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conscious. The physician becomes the agent whereby individual immortality may possibly be accomplished. Medicine, in its broadest bearings, is the projected wish of the community to ensure its continuance.

I have stated this in a slightly different form as follows:[2] "The physician, viewed as a functional unit in society, represents for the individuals in that society, that portion of themselves given over to the protection of their bodies from the forces of disease. Each patient therefore identifies the physician as a part of himself, a special part, and psychically speaking, identical, if like the rest of himself, *i. e.,* if there is sympathetic insight. This sympathetic insight, this identification with self, or if you will, stating it in other terms, this taking up of the father-image, the mother-image, the brother-image, is one of the fundamental causes for the transference given to the physician. Without it, the physician lies without the pale, and so far as the psychical life is concerned, can be of little or of no service."

The patient's relation to the physician in the treatment of psychogenic disorders—and all human ailments have mental components—is therefore a much more fundamental and human affair than most physicians realize. The intensity of the unconscious feeling is known to but few, or felt by the many only at certain more vital moments in life, and that often but for a moment. The physician is from the unconscious point of view constantly involved as a symbol to afford that sense of security which in the unconscious is to exclude the fear of death—physical, financial or social.

I desire before going further to call attention to another study by Stanley Hall which is a most masterly presentation of this *fear of death,* without a comprehension of which there can be little understanding of the principles of psychoanalysis. He says relative to the present theme,[3] epitomizing very roughly, (1) that fear of corpses is quite primitive, although found in infants only in the form of a nervous shudder set off by coldness, immobility, pallor, sunken and partly closed eyes, etc., on a background of strange surroundings with the social contagion of grief. The death-fears of generations of human forbears are inherited in the form of neural predispositions to shudder, but with no intelligence and little or no consciousness. This is more reflex than instinctive but in it is the

[2] Some Notes on Transference, Journ. Abn. Psychology, 1914.

[3] Stanley Hall, Thanatophobia and Immortality, Am. Jour. Psychol., Vol. 26, No. 4, October, 1915, pp. 566–569.

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promise and potency of a mass of later and higher reactions. Here the analogy with sex is close for *ludeln* and *lütschen* and infantile anal and other isolated prelusions of sex are on the same level. They are fragmentary partial impulses (*Triebe*) with no awareness of sex but are only the first ontogenetic expressions of a long phyletic experience with sex. As the first naïve infantile curiosity about sex is soon powerfully repressed, so the first interest in death suffers multifarious repressions. So effectively have shame and modesty stamped themselves upon our organism that we have many cases in which the first envisagements of sex cause a painful and normal repulsion, as in the case of the servant girl who laid an infant on the floor to make the bed, and by stepping over it aroused in the babe an aversion for all girls that lasted well on to puberty, or as in Ernest Poole's "The Harbor" the boy of seven saw on a forbidden street a gross scene between a drunken sailor and a vile woman, which killed for a long time the great previous charm of that general locality, and again in the early teens when he saw the red garter that had accidentally slipped down over the ankle of his favorite girl playmate of twelve, he felt an aversion that sent him suddenly away from her for years, unconscious as it all was on the part of them both. Such cases illustrate how effectively nature arms the normal soul against sex precocity. In the same way she would shield the young child from the premature realization of death and allow it to linger in the animal plane before it was known. That necrophilism has its germs in infantile experience as truly as does anal eroticism there can be little doubt, although we have as yet few analyzed data on the subject. It of course goes with the fact that death is not known for what it really is.[4]

(2) "The instinct to deck out, to beautify and perpetuate the corpse, occasionally to photograph and in Egypt to mummify it, is less analogous to the impulse to purify the exhibition of the nude body in art or to sacramentalize the sex act in phallic cults. Both tendencies developed in the teeth of a strong contravalent trend. Erotism toward corpses in the sense of Krafft-Ebing and Tarnowski might stand for the extremest form of the negation of death just as a truly immaculate conception, with suppression of all passional lust in the interests of the offspring, would be the ambivalent pole, while mummification would be more like the ritualization of coitus: but in an article like this one can hardly dwell upon the details which to my mind validate this thesis.

[4] See the literature already quoted for these psychoanalytic studies in nekrophilism.

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(3) "Diversion is plainer. From the fig leaf or breech cloth up to the wedding dress, flowers, gifts, nuptial ceremonies and customs, we have displacement from the acts and organs in which wedlock is consummated to hair, face, arms, movements, ritual, music, dot, honeymoon, etc., in ever-widening irradiation. So in death and funerals, attention is directed to grave clothes, the coffin and its trimmings, flowers, perhaps incense, chants, solemn religious ceremonials, feasts before and after, wakes, vigils, ending in a formal commitment of the body to the natural forces of disintegration. Of the bride and groom, as of the dead, we speak only good, and we would almost as soon speak ill of one lover to another as of the dead to surviving friends and mourners. As death of one mate often revives love where it had begun to languish so separation may fan the flame of affection and make for idealization. Death beautifies and perhaps beatifies, and also awakens the conscience of the survivor at the memory of real or fancied mistreatment.

(4) "One of the chief causes that first suggested and then made man cling with such persistence to the belief in souls was the far greater difficulty in grasping death as annihilation. The passing of the body cannot mean the end of all. Something must servive, for the mind like nature abhors a vacuum, and hence we have to postulate something in place of the vanished body. The dead thus are not quite dead and from this faint suggestion slowly evolved the primitive ghost cults and finally fully panoplied heavens and hells, with the conception that the body was a mere husk or shell which, when it was sloughed off, liberated a far more glorious and enduring soul. Thus belief in the immortality of the soul arose partly as a compensation which man's artistic nature evolved to make up for the realization of the mortality of the body. It was a consolation-prize, precious because it atoned for the supremest of all calamities. So love, at first purely animal and selfish, slowly came to realize that it was not a finality but that it was for the sake of offspring. Love that is only physical and personal satisfaction means for fallen man the gradual extinction of his stirp, while eugenics, which is a new religion of life, regards chiefly the immortality of the germ plasm. It compensates for a love that is only scortatory, supplying another object than the mate, viz., the child, in which not only does passion find a vicariate but which gives an object on which those unmated can lavish all their affection. Especially parents live on in their well-begotten and well-bred children, and when senescence has sapped the roots of mere

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amorousness, love for offspring is distinctly reinforced, as we often see in the assiduity and indulgence of grandparents, which so exceed that of parents. Thus love provides for itself in the aged and in the unwed a normative surrogate for posterity. We have been told that the most prolific races and social classes in the Occident are those that believe in the immortality of the individual soul, and conversely that the least so are those that doubt it. If this be true, we have yet to find the mechanism of this correlation, but the fact, if it be such, is of the utmost psychogenetic as well as pragmatic importance.

(5) "Another great product of the fear of death and its agent, disease, is medicine and hygiene, to say nothing of all forms of life and health insurance, etc. Man's deepest impulse is to live as long, intensively and richly as possible, that is, to attain macrobiotism. Everything that checks this maximum is lethal, for both life and death are of all degrees, death being only the zero on the life scale. Fear is not merely the will to be immortal as Stekel[5] defines it, but the will to live out completely all that is in us. We realize every possibility and expand every dimension of our nature. We long to be just as well, strong, happy and vital as possible, and strive against everything that impedes this wish or will, while we imprecate even our parents if through their fault we are born short or handicapped with disease. We love life supremely and cannot have too much of it, and foods, drugs and regimen are precious just so far as they minister to this end, while we dread all that interferes with it. This lust for extreme individuation, however, has at once its consummation and its reversal in love. It is at once the acme of self-affirmation and of self-renunciation, for it is no less kenotic or self-emptying, since subordination also begins in love, which must serve. Just as what we know as anger consists of only partial and almost erratic outcrops of the generic aggressiveness of man by which he has conquered nature and his enemies, and has explored, investigated, and accomplished all his active achievements in the world, so what we see as fears and phobias are only the remnants and almost random residua of man's passivity and plasticity, which have from the beginning made him receptive and docile, which have culminated in the development of memory and science, and which began in adjustments to the ways of nature and of the social environment. This change is one of the most pregnant of all the insights of genetic psychology, and shows us how

[5] Nervöse Angstzustände, zweite Aufgabe, 1912.

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knowledge is itself so largely a product of fears (which culminate in the fear of death) and their correlate, the love of life. Each of them has innumerable degrees and of these art and religion, no less than hygiene and science, are the results, for all of them are but progressive realizations of the ever more patent possibilities of human nature with all its still slumbering and yet to be evolved latencies."

This is not yet the place to go more fully into those mechanisms which Freud has termed hypochondriacal anxiety, social anxiety and religious anxiety, sense of shame, etc., nor to show how they are pragmatic hypotheses to explain how the sense of individuality, ego-consciousness, is moulded—nor how the great work of repressing the infantile partial libido trends into the unconscious is accomplished.

The infantile mind has little comprehension of death. Hall[6] has compressed the psychoanalytic results when he writes "The psychology of death has very much in common with that of love, especially from the new genetic and psychoanalytic viewpoint. Each has an unenvisagable fact at its core as a point of departure, the one a putrefying corpse, the sight of which started Buddha on his career, the other the sex act; the one the most horrid, the other the most ecstatic of all human experiences. The inutterable psychalgia of the one and the shame and modesty that veil the other have in both cases made and used the same mechanisms, such as fetishisms, diversion, repression, over-determination, sublimination, etc., and by their action from each of these cores have evolved the most manifold and elaborated superstructures that have played a tremendous rôle in human culture. There is a sense in which all fears and phobias are at bottom fears of death or of the abatement or arrest of vitality, and also a sense in which all desires and wishes are for the gratification of love. The one is the great negation, and the other the supreme affirmation of the will to live. Orientation toward these two poles of experience is not innate in the sense of being finished and operative at first but is quite gradually acquired. The real meaning of death is not understood until puberty but both death and love show fragmentary and generally at first automatic outcrops from early infancy on. Freudians have shown how love has its artistic expressions in the forms of infantile reflexes, almost from the first, and we will first attempt to point out how far analogous prerepresentations occur in children with respect

[6] Loc. cit.

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to death. Fear of death is only the obverse of the love for life and together they constitute the struggle to survive."

"The development of the fear of death or thanatophobia in children is a striking case of recapitulation. The infant, like the animal, neither knows nor dreads death. The death-feigning instinct in animals is only catalepsy, and the horror of blood that some herbivora feel is not related to death. From Scott's 226 cases and Hall's own 299 returns to questionnaires, it appears that the first impression of death often comes from a sensation of coldness in touching the face or hands of the corpse of a relative, and the reaction is a nervous start at the contrast with the warmth which cuddling and hugging were wont to bring. The child's exquisite temperature sense feels a chill where it formerly found heat. Then comes the immobility of face and body, where it used to find prompt movements of response. There is no answering kiss, hug, pat or smile. In this respect sleep seems strange but its brother, death, is still more strange. Often the half-opened eyes are noticed with awe. The pallor, shroud, and especially coffin are often focused on fetishistically, the latter being a strange bed. The friends are silent and tearful, and the infant who has been permitted such scenes often turns away, perhaps almost convulsively, to whomever holds it, as if in fright. The crying, however, seems more reflex than ideational. Older children of from two to five also are very prone to fixate the accessories of death, often remembering the corpse but nothing else of a dead member of their family. But our data suggest that funerals and burials are even more vividly and often remembered. Sometimes these scenes are the very earliest recollections of adults. The memory-pictures of these happenings may be preserved while their meaning and their mood have completely vanished, and but for the testimony of their elders children would not recall later who was the center of it all. Henceforth the dead is simply an absentee, and curious questions are asked as to where the departed has gone, when will he return, why cannot the child go to or with him. The infantile mind often makes strange mixtures of its own naïve constructions and adult answers. The distinction between psyche and soma, of which death is often the first teacher, is hard for the realistic mind of children to make. Told that Papa or Mamma sleep or rest in the ground, they ask why there, where it is so cold and dark, why they do not wake, what they eat, and who feeds them, impulsions that primitive burial customs often elaborately answer by preparing bodies for re-animation,

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leaving food, and utensils, with the corpse, etc. When told of Heaven above children have strange crass fancies, perhaps that the body is shot up to Heaven, the grave dug open by angels, or the body passed down through the earth and then around up; the body generally gets out of the grave and goes up to Heaven by night, etc. As the idea of soul begins to be grasped, it is conceived as a tenuous replica of the body hovering about, sometimes seen, though rarely felt. It may be talked to or fancied as present though unseen. Children's dreams of the dead are vivid but rarely dreadful. In general the child thinks little or nothing but good of the dead, and the processes of idealization, aided by relatives, may almost reach the pitch of canonization. The memory of a dead parent barely recalled may become a power shaping the entire subsequent life of sentiment, as if all the instincts of ancestor worship could focus on an individual parent. Some adults maintain quiet sacred hours of ideal communion in thought with their departed loved ones, and their yearnings make a favorable soil for the ghost cult of spiritism. This component of our very complex attitude to dead friends is also the stratum which crops out in the holy communion sacrament of the ghost-dances of our American Indians, in which the souls of all the great dead of the tribe are supposed to come back and commune with their living descendants. Just in proportion as the dead are loved does death work its charm of sublimation and idealization, and just as a child of either sex has loved the parent of the other sex, will he or she idealize a chosen mate snatched away by death. Thus, too, one factor in the belief in immortality is love, that must conserve its object though deceased, this factor being quite distinct from the transcendental selfishness that would conserve one's own ego."

"On the other hand, young children often seem rather to rejoice at than to fear death. The excitement of all its ceremonies is intensely impressive and new. Some children naïvely express the wish, after a funeral is over, that someone else would die. They play funeral, striving with each other who should assume the central rôle of the corpse, which they feign well. One four-year-old tried to kill a younger mate and several abnormal children have actually done so, in order to enjoy again the excitement of the death, funeral and burial. A sweet young girl was found dancing on the grave of her baby sister, chanting, 'I am so glad she is dead and I am alive,' suggesting, not the ancient days of famine when every death left more food for those who survived, so much as jealousy

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at the diversion of parental attention and care to the younger child. Neurotic children often play with unusual abandon, as if to compensate for the depression, when they have just left the room where parents, brothers or sisters have breathed their last. Small boys who lose their fathers say, 'Now I will milk, cut wood, bring up coal' and sometimes they put on the father's hat or shoes, and in many ways assume his rôle, while little girls whose mothers die become more tender to their fathers and the other children, feeling themselves in some degree the surrogate of the mother. Just as children of tender age far more often fear the death of others they love than they do their own, so they vastly more often wish the death of others they hate than they feel any suicidal impulses. The death-wish, once fully felt and realized in consciousness, may, in neuropathic children, set up a prolonged and morbid corrective process to strangle it, and psychoanalysis has given us many cases where over-tenderness to a parent or relative, so insistent as to become troublesome, was motivated by the impulse to atone for a vivid wish of death, which the child may have made toward the object of anger. Only relatively late is the death-wish generally directed towards enemies and the ambivalent life-wish reserved for friends. Even in the most highly evolved emotional lives this is only a question of preponderance, for if our analysis is not mistaken, there never was a death, even of a lover, that did not bring some joy to the survivor, swallowed up though this component be in grief. Were this not so, comforters and consolations would be no resources. We strive to think our dear ones are happier and more at peace, console ourselves first with precious memories, and then ascribe superior powers of transcendental enjoyment to the dead. Conversely, no savage ever killed the bitterest foe of his tribe without elements of pity and efforts to atone to the soul of the victim or his friends by saying propitiatory words or performing placatory rites. Even Hell and devils never kill the soul and there are spots and spells of remission of torment so that surcease and nepenthe are not unknown even in the inferno."

"When children are realizing at the most rapid rate what adulthood means, they often have very serious struggles with a more or less intermittent but at times overpowering sense of their own *Minderwertigkeit,* insufficiency, or in completeness, in the sense of Janet and Adler. Tolstoi has given us a vivid characterization of this impulse in a record of his own boyhood. His tutor flogged him, and he reacted as the only way in which he could "get even"

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by not merely the thought of suicide but the vivid imagination, well set in scene, of himself dead and his father dragging the terrified tutor before the beautiful corpse, and accusing him of having been his murderer, while the friends around bemoaned him as so brilliant yet so tragically driven to death."

We are getting nearer to a comprehension of what transference means as a very strong unconscious libido flow to afford to the individual a sense of security; to drive away any fear that is related to death (impotency in the large sense).

We shall come to see that transference starts very deep in the unconscious. It grips from the most primitive libido foundations, but I think it worth while as a practical issue to follow it at a more superficial stage; *i. e.*, a stage to which it evolves after the infantile period. If the mode of expression of the libido of the individual at this stage is grasped we can later push it further back.

Adler[7] has made a special study of this phase of the problem. No complete presentation of his views is as yet available in English, hence a very brief summary may be considered worth while as bearing on the general problem of psychoanalysis and on the comprehension of transference. I myself found that certain features of the transference and resistance of patients' dreams were incomprehensible until Adler's views were better known to me.

Adler was dissatisfied, as many others have been, with the current conceptions of disease of all kinds. They were beautifully descriptive but not at all genetic. He was anxious to get away from the benumbed and thwarted conceptions of disease and to be able to observe human pathology in the making.

The reading of any work on pathology, so far as the etiology of disease is concerned, consists of a short collection of truisms. Such terms as chill, predisposition, poisons, infections, disturbance of circulation, appear and reappear. Nowhere is there any real comprehension of these causal factors themselves. Nowhere does any pathology say, why for instance, in scarlet fever, this patient or that has implications of the middle ear of the kidneys. Why do certain things evolve in certain organs and not in others. Adler casts himself loose from the ordinary static positions and endeavors, by a study of a number of cases with defective urinary apparatus, to show that in the first place there is an effort on the

[7] Adler, Studie über die Minderwertigkeit der Organen, 1907, now available in translation, Monograph Series No. 23, 1916. Nervöse Charactere, 1913. English translation by Glück and Lind, Moffatt, Yard & Co., New York.

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part of the individual to evolve to a higher form and each one does it by some supreme effort to physically compensate for the organic inferiority. He thus gets at a genetic view of human evolution through its phylogenetically inferior organs. So he regards constitutional organic anomalies at the basis of most diseases. This inferiority is registered in the unconscious and evolves to a feeling of psychical inferiority. Incidentally I take it that Southard in his extensive series of studies on human brains is endeavoring to show that such organ-system inferiority may actually be registered in brain structure as determined by macroscopical and microscopical methods. He thus is approaching the problem from another angle.

This unconscious psychical inferiority gives rise to unconscious compensatory phenomena. These are character traits—so often explained on a conscious basis, but which are vast constellations and in need of individual analysis. Yet they have been of sufficient symbolic value to have caused that immortal line "O wad some power, the Gift to gie us," etc., to have found universal credence.

This work of compensation, as Adler outlines it, is well summarized by Hall.[8] "Every subnormal [minderwertige] organ is more plastic and adaptable than normal organs or functions. Under the stimulus and protection of the central nervous system when it has taken the helm they may become not only the more variable in other ways but may even become supernormal. What is more important, they may be compensated by other organs or functions with which they are correlated. Moreover, superstructures are built which vicariate for them, supplementing their deficiencies. Thus recalling that man is a congeries of many organs in various stages of evolution and decline, the nervous ssytem when it comes to power establishes a set of interrelations between those that are essential under the will to live. Leaving some to decline and powerfully stimulating others to unfold and develop, by keeping them sufficiently but not too much in exercise, it reinforces both atrophy and hypertrophy. In the effort of the psyche to foster the important organs and functions which it selects for its special care, organic defect may be compensated by excess of nervous activity. Indeed, most compensations are in the psychic though not necessarily in the conscious field. No one is perfect, and hence compensation is necessary for all. It makes for, if indeed it does not make, consciousness itself. Those organs and functions which the psyche cannot directly or indirectly control decay or become stigmata. Where the

[8] Hall, l. c.

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brain fails to establish a compensatory system we have all the hosts of neuroses and psychoses. The existence of sub- or abnormal organs or functions always brings Janet's sense of incompleteness or insufficiency, and this arouses a countervailing impulsion to be complete and efficient which those to whom nature gave lives of balanced harmony do not feel. The ideal goal is always to be a whole man or woman in mind or body, and this may crop out in the childish wishes that are sometimes fulfilled in dreams, in the ambition of the boy who aches to be a man, and in general in the desire to overcome all defects and to evolve a full-rounded, mature, powerful and well-balanced personality. To illustrate, each bilateral organ compensates for defect in the other, one sense for another like touch for sight in the blind. Mozart had an imperfectly developed ear; Beethoven had otosclerosis; Demosthenes stammered and, as if mythology had recognized this law, many of the ancient gods were defective. Odin had but one eye; Tyr, one hand; Vulcan was lame; Vidar dumb. So, too, the ugly Socrates made himself a beautiful soul. A man with a weak digestion becomes a dietetic expert in battling with fate. Little men walk straight; tall men stoop. Handsome men are superficial. A subnormal eye intensifies the visual psyche. In the effort to control enuresis due to renal insufficiency over-compensation may predispose to even dreams of water. Sex weakness is supplemented by fancies of superpotence. Many diseases have compensating forms with which they alternate or for which they vicariate and the very principle of immunization is involved. Weak parts and functions draw attention and are invigorated thereby. Fear of an object excites interest in it and this brings the knowledge that casts out fear. Very much of the total energy of all of us and still more of that of neurotics and psychotics is spent in developing and using devices of concealment [Deckphenomene] of diseases and defects. Thus often the higher protective and defensive mechanisms come to do the work of the subnormal function even better than it would do it. Conversely compensation has its limits and when it breaks down we have anxiety, the most comprehensive of all fears and the alpha and omega of psychiatry, the degree of which is inversely as the ability to realize the life-wish of self-maximization. It involves a sense of inferiority, inadequacy and greater tension. The goal may be the humble one of self-support, normality, merely absence of actual pain, or deformity, but the prospect of failure to attain it brings a distress probably equalled by no other form of suffering and every

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fear is a special form or degree of it. If the good, strong, healthy, higher components can neither improve nor atone for the bad, weak, low or morbid elements, anxiety, conscious or unconscious, supervenes, values lose their worth, we tend to take refuge from reality in fancies, and innate momenta are arrested and we suffer we know not what, perhaps fear itself."

All this and more is going on in the unconscious. The patient with a neurosis is searching for a sense of security—"Sicherung" as Adler terms it. Here is where the Œdipus formula comes in. They find it in the parental images—in the unconscious. Hence they seek in the physician the same parental image in order to get the sense of security. It is much disguised, it is true, but nevertheless there. It is an unconscious attachment (positive transference), or denial (negative transference), with many currents and countercurrents.

Dynamically this transference is at the basis of all psychotherapy —and much pharmacotherapy. As Osler put it for the latter "Without faith in our pills they would avail the patient little, apart from the bare half dozen known specifics."

The first fundamental studies of transference were given us by Freud[9] and by Ferenczi.[10]

Freud here discusses how the use of the dream can help the analyst to watch the transference, the barometer of the patient's unconscious hopes and discouragements, his desire to get security, his disapproval if he thinks he fails.

The first dream of the patient is extremely important. As Freud says if this is neglected one may have to retrace one's steps very definitely in order to catch up the patient's interest.

Let me illustrate. The following dream was that of a young woman of 32 who was suffering from a mild depression, a sense of unworthiness and of failure. *"I was in a room and on a balcony, to my left was a man dressed in a Roman toga, talking Chinese; and preaching a Hebrew religion."* The ideas which free association brought out of this dream were very diverse but from them I learned, for myself at any rate, that the patient did not understand what I was talking about, that her unconscious was commenting on the choice of my words and of my ideas. She had learned a little concerning the nationality of Freud and the whole discussion of the

[9] Zur Dynamik der Uebertragung, Zentralblatt für Psychoanalyse, Vol. II, p. 167.

[10] Introjektion und Uebertragung, Jahrbuch I, 1913.

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subject was Chinese to her. I had evidently set forth too much in explanation. The analysis of my own resistances taught me to come down from the balcony and try to understand her better.

Another first dream is related by a woman of forty. This dream took place after the second interview. The patient had previously stated that she never dreamed and on the second visit she laughingly said "Well, I did dream, but I only recall a fragment of it." "*Apparently I was on a golf course and Dr. X. was hit on the side of the head with a golf ball.*" Her first association saying in answer to my question, Did the dream convey any idea to you? was that it meant nothing, but Dr. X., her brother-in-law, married to a younger sister, was one of those *new golfers that always wanted to get ahead so fast* and did not wait until the players had all driven.

From this I learned very quickly that among other things she gave me a sharp rap on the knuckles for going so fast. The resistance was analyzed on the spot, and matters went along slower but more securely.

Freud has called these "announcement dreams."[11] They often serve to tell the analyst what the patient's first unconscious impressions are concerning him, and they also often announce the whole character of the conflict. This is true particularly for those patients whose conflicts are often half grasped (foreconscious). The following is an illustration:

The patient, twenty-eight years of age, whose chief complaints were persistent headaches at the back of the head, a sense of great tenseness, a marked trend to suffusion of the face, pathological blushing, with a host of transient gastro-intestinal and other phenomena, at the second interview related: "*I am on a bleak hillside, there is a threatening cloud coming up from the valley. I am with a little girl; I am anxious to get seven or eight little books into the house where they will not be destroyed, and we bring them in and put them on the washstand.*"

My first question was (Why "*or* eight?") To which the reply was "I do not understand." I then said: "What are books to you?" Books, stories, life histories, life experiences. These were the associations. (And washstands?) Something to clean, to wash. And I replied, "You wish to tell me [the threatening cloud] about seven life experiences which you have had in order to cleanse them and be cleansed by the telling of them [confessional motive], and the eighth is just formative, and that is why you said *or* eight." To

[11] Maeder, Jahrbuch, Vol. IV, page 692.

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which a reply was made. "Yes, I think that I have made up my mind that you can help me, and it seems necessary that I should be able to find some one to trust and to tell what is constantly in my mind, and which keeps me distressed all the time."

Here the transference put me in the place of a father confessor and announced at the same time, even in the upper level of the dream, there were seven or eight unworthy experiences which had to be gotten rid of to get at the deeper levels of the conflict. This dream, also by reason of its compactness—overdeterminism—announced epochal periods of the patient's life with reference to conflicts occurring at the age of 7, at 8, at the age of the little girl in the dream 15 ($7+8=15$) and I was also able to make a shrewd inference of the nature of the "*or eight*" experience ($5\times 3=15$), mutual masturbation symbol. This had occurred at 7, 8, and at 15, and was the stage of the "*or eight*" experience. Concerning these numbers in dreams, however, I shall delay saying anything until I discuss the question of the technique of dream interpretation.

Thus even with no great technical elaboration it may be seen how an early dream will announce the whole situation, and also indicate where the analyst stands in the patient's wish to get well (cleansing symbol = wish for ethical rehabilitation).

Another illustration may also indicate this early announcement of the conflict and the patient's formulation as to how the unconscious portrays the analyst. It may be said here, as a preliminary, that it is very frequent to find that the dream very soon pictures the analyst by some characteristic feature. I myself am large and stout —5° 10′, 200 pounds, clean shaven, with a roundish face. Hence it is clear why I should appear with great regularity, especially in the early stages of an analysis—before the patients perceive how they are telling their innermost thoughts—as a policeman, a motorman, a chauffeur, a priest. The simpler the type of mind the less am I disguised. Each analyst will by a careful review of himself soon learn to recognize the more obvious symbols of himself. Later on the analyst goes deeper and deeper into the patient's conflicts with the infantile pleasure principle and as the analysis threatens to reveal these to the patient in uncomplimentary forms, the disguises become more or less subtle and often not at all flattering to the analyst. The analysis of the patient consists, however, in the comprehension of these resistances which frequently hide behind these unflattering pictures the peculiarities of the analyst himself. Thus the transference becomes an exquisite sensitizer, which rightly used

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compels the analyst to search his own complexes and resistances and forces him to keep the goal in view—that is the patient's best interests and not his own gratification or glorification, financial or otherwise.[12]

The next example, fragmentarily presented, is taken from the history of a young married woman, twenty-six years of age, who had had two miscarriages, and who, much reduced in weight, had lost all interests in everything, had a number of hysterical conversion signs, among them an intense acne around the mouth and chin and left cheek, insomnia, vomiting, etc. She dreamed:

"*I am all alone on a desert island* [wish for lack of conformity to social demands] *Hawaii, Honolulu, or what not* [wild infantile libido]. *I was told that I would meet every one I loved on the Island* [early wish source]. *I met my mother* [first nutrition object and first determiner for mouth location of wish = acne] *and she was very sad* [identification of own state]. *Her husband did not love her any more* [detachment of patient's own libido from husband—for nutritive and other defects]. *I met a cousin of mine with two lovely children* [own missed opportunities] *and she was very happy. She asked me why I was so sad, and I said because my father did not love my mother any more and she said* [sad self vs. happy self]: *if you believed in Yogi, as I do, you would be happy* [transfer symbol and wish for recovery]. The dream then went on to a discussion of the relative values of God in whom patient believed, and Yogi in whom cousin believed.

As the dream is being used solely to illustrate one point, namely that of the beginning of the transfer situation and the announcing of the conflict, I shall not go into it deeply. The discussion meant that the patient was trying to decide to tell Yogi [myself = the wise man, new religion] what lay between her and God, *i. e.*, what only God and she knew. This was that she no longer loved her husband. There had occurred therefore a deep regression of the libido, back to the wild, infantile wishes which would supply her sexual and nutritive instincts and how was she to get away from what seemed to her an intolerable position. She therefore was preparing herself to see if there was not some—even occult—way of getting well, and that possibly psychoanalysis, concerning which she had some crude ideas that it might have some mystical leanings which—she did not even consciously know there was such a word

[12] Jelliffe, Some Notes on Transference, Journal of Abnormal Psychology, Vol. VIII, No. 5, p. 302. Also see discussion, page 346.

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as Yogi—would help her. I had said nothing to her of psychoanalysis, but in the first visit I had gone very thoroughly into all the minutiae of her case. Following this dream she wrote out a detailed history of the entire surface features of the conflict, describing all her aspirations concerning marriage, its keen disappointments, an earlier engagement with a vigorous, energetic individual (Hawaii, Honolulu—his name began with H), the direct antithesis of a "good and worthy" husband.

The favorable attitude of the unconscious wish (*if you believed in Yogi you would be happy*) showed an early desire to follow the therapeutic ideas which were more rapidly developed after this initial tender of confidence.

I shall not go further into the dream, but I may say that if it seems desirable almost any dream will contain the entire conflict of the individual.

As Steckel has well said: "The dream is a microscopic world, which reproduces in miniature the whole psychic world."[18]

These few examples offer some illustrations concerning the more positive side of the beginning of an advantageous position for the analyst. A few of the negative types in the beginning of an analysis may be equally of service, as indicating wherein one is not making ground. It must be borne in mind by any one who is working with psychical material, that fundamentally people are much alike; the unconscious, containing a racial recapitulation (inheritance) of one hundred million years is very much on a par all around.

I frequently illustrate this to my patients by saying that the entire active life of the individual may be represented by a fraction, the numerator of which is any particular moment, the denominator is the rich inheritance of the past. Psychology and most reasoning has heretofore concentrated its attention on the numerator, and has made it appear to be the active life. Conscious knowledge has been made the criterion of man's entire activity. The denominator, which is infinitely more extensive and more important is either neglected entirely, or vaguely spoken of as intuition, instinct, temperament, personality, feeling, and the individual who thinks he or she is different is spoken of as "psychic" or by some other such term. Behind these phrases, however, there lies the whole of the unconscious material that has been accumulating since cosmic forces first began their careers. It is the "As it was in the

[18] Steckel, Die Sprache des Traumes, 1911, Bergmann.

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beginning, is now and ever shall be, world without end, Amen." This is the material, the soul, or desire or wish[14] part of action with which psychoanalysis deals. It is interested in denominators, and the analyst only listens to numerators for the purpose of reading behind the scenes since he knows that every consciously expressed opinion is always a compromise, a resultant of forces in a polygon of forces. It never is the entire truth. Perhaps the psalmist was not so far wrong when he said "All men are liars."

[14] Consult E. B. Holt, The Freudian Wish, H. Holt & Co., N. Y.

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CHAPTER VI

Transference and Resistance. Opposing yet Identical Mechanisms. Practical Signs

It is to be remembered that a neurosis, no matter how slight—and no one is absolutely free of some minor neurotic symptom—is an indication of a failure to get some energy (libido) released for the socially valuable use of the individual, hence every neurotic has what Freud has so well termed *floating libido*—a libido that fails to attach itself to a reality motive and thus fails to satisfy the individual (sense of power). They are, so to speak, always looking for something. This is frequently spoken of as the ideal part of the neurosis, the essentially moral or ethical urge that, finding it difficult to accept the inflexibility of the environment of the individual setting (herd) tends to regressively accept, often with extreme reluctance, an earlier stage of adaptation.

In every individual's growing up these definite stages of satisfaction of the wish life, the love life, are reached and passed for others; as Tennyson puts it, "We rise on stepping stones of our dead selves to higher things." The stepping stones, however, have always the aspect of stopping places. Those who do rise, do so by fitting into reality, those who do not, remain in fantasy, and the mosaic of character is a fascinating and intricate patchwork of these dynamic factors, conscious and unconscious.

Thus in any form of therapy, for it is not confined to psychotherapy, the patients turn expectantly to every new person (physician, healer or what not) for the floating libido hopes to find in the new object its satisfaction, conscious (small numerator) as well as unconscious (large denominator).

In the previous discussion of the family neurotic romance, p. 54, et seq., I have described some of the types of ideals that have been formulated. Hence in the new situation the physician is fitted into any one of the psychic series. The unconscious fear situation elaborated in the last series of remarks, immediately involves the physician with immensely over-dynamized protective capacity. He becomes father image, brother image, mother image, etc.

Freud in his "Dynamics of the Transference" calls attention to a point that might be considered here. He points out two unexplained

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features of the transference which are of especial interest to the psychoanalyst: First, whether in the analysis of neurotics the transference is found to be much stronger than with those unanalyzed, and second, why the transference appears as a strong resistance to the treatment. As to the first question it is not true that in psychoanalysis the transference is more intense and unrestrained than in other forms of therapy. One observes in institutions, where nervous diseases are treated without analysis, the highest intensity and the most unworthy forms of transference amounting even to subjection and also the most downright erotic coloring of the same. These features of the transference are not to be ascribed to psychoanalysis but to the neurosis or psychosis itself.

In my own studies in the history of psychiatry I find abundant proof of this from the earliest Homeric descriptions to the present. This renders stupid the contentions of many authors that psychoanalysis creates the symptoms. One might just as well argue that seeing a nude created the instinct of reproduction. While I am writing this I have been telephoned to by a fellow physician (a Janus-faced Freudian) who has seen a patient I had seen for five times the month previous. For perfectly well understood economic reasons I could not treat the patient. He started to tell me that psychoanalysis (which had never been started) was responsible for the pseudo-erotic coloring of her symptoms. I dryly suggested to him to inform himself from Dr. X (a general practitioner) who had treated the patient six years previously, at which time she was actively elaborating highly erotic situations. It is by no means infrequent that a patient who is going into a psychosis is seen by the analyst at just this period. The acute breakdown which soon becomes evident is frequently attributed, and often by those who ought to know better, to analysis. It is just as sensible to say that the giving of a pill by an internist to a patient just starting a typhoid, caused or precipitated the typhoid.

With reference to the second problem, why the transference should appear in the psychoanalysis as a resistance—which is an intensely vital subject—Freud calls attention to the fact that a regular and indispensable previous condition in every case of psychoneurosis is the condition which Jung has well named the introversion of the libido, that is to say, the portion of the libido capable of consciousness and turning toward reality is diminished. That portion of it turned away from reality, unconscious, which may perchance still feed the phantasy of the individual, but belongs to the

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unconscious, is so much the more increased. The libido because of some definite relation to the external world (in general, failure of satisfaction) has given itself over entirely or in part to regression and reanimated the infantile images. Upon this follows the analytic treatment which searches out the libido to make it again accessible to consciousness and serviceable to reality. Where the analytic search strikes upon the libido withdrawn into hiding, a conflict must break out, all the forces which have caused the regression of the libido will rouse themselves as "resistance" against the work, in order to preserve the existing condition of affairs.

The resistances of this origin are not the only ones nor by any means the strongest. The libido at the disposal of the personality has always stood under the attraction of the unconscious—more correctly of those portions of the complex belonging to the unconscious —and it found its way into the unconscious because the attraction of reality had abated. In order to free it this attraction of the unconscious must be overcome, also the repression of the unconscious instincts and their productions hitherto existing in the individual must be released. This furnishes by far the greater part of the resistance, which so frequently allows the disease to continue even if the turning away from reality no longer has the same foundation. The analysis has to struggle with the resistance from both sources, resistance that accompanies the treatment at every step. If one follows up a pathogenic complex from its representation in consciousness to its root in the unconscious one soon comes to a region where the resistance makes itself so clearly felt that the next step must reckon with it and appear as a compromise between its claims and the investigation into it.

If perhaps something of the material (content) of the complex is suitable to be transferred to the person of the physician, there the transference arises, furnishes the next idea and announces itself through the symptoms of the resistance, perhaps through an obstruction. It may be concluded from this experience that this idea of the transference has therefore succeeded before all other possible ideas in consciousness because it has also satisfied the resistance. Repeatedly if one touches upon a pathogenic complex the part of the complex prepared for the transference will be pushed into consciousness and defended most stubbornly.

After overcoming this the conquest of the other factors of the complex gives but little difficulty. The longer analytic treatment lasts and the more clearly the patient recognizes that the distortion

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of the pathogenic material offers no protection against its uncovering, so much the more self-importantly he avails himself of the one mode of distortion which plainly brings him the greatest advantage, the distortion through transference. These relations take the direction of the situation in which all conflicts must be fought out in the territory of the transference, and the transference appears to be the strongest weapon of the resistance, while the intensity and persistence of the transference are effects and expressions of the resistance. The mechanism of the transference is adjusted through leading it back to the preparedness of the libido which has remained in possession of infantile images; the explanation of its rôle in the treatment is successful only if one enters into its relations to the resistance.

How does it happen that the transference is so preëminently adapted as a means for the resistance? It is clear that the confession of every forbidden wish impulse is made more difficult if made before the person who himself is the incitor of the wish. On the other hand a relationship of tender, self-surrendering dependence can help over all the difficulties. The transference to the physician may just as well serve for the discharge of the confession and not increase the difficulty.

The answer to these questions will not come through further deliberation but through experience acquired in the research into individual transference and resistance. The utilization of the transference for the resistance cannot be understood so long as one thinks merely of the "transference." One must decide to separate a "positive" from a "negative" transference, that of an affectionate feeling from a hostile one, and to treat both kinds of transference upon the physician separately. The positive transference separates itself into such friendly or tender feelings, which are capable of consciousness, and into the continuation of them into the unconscious. Of the latter the analysis furnishes proof that they regularly go back to infantile sources, so that the insight is obtained that all our worthy relational feelings are genetically bound up with the generative instinct, that the merely cherished or honored person of our reality can be for our *unconscious* always a love object.

The solution of the problem is also that the transference to the physician adapts itself to the resistance in the treatment only in so far as it is negative or positive transference from repressed erotic impulses. If we "raise" the transference by bringing it to conscious-

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ness only these two components of the emotions are detached from the person of the physician. The other component capable of consciousness and harmless remains and is the bearer of the result in psychoanalysis as in other therapies. So far it is freely admitted the results of psychoanalysis may be compared to suggestion; only under suggestion must be understood what Ferenczi[1] finds in it, the influencing of a person through the transference phenomena possible with him. We are careful while using suggestion for the final self-understanding of the sick to allow it to complete a psychical work which has for its necessary result the lasting improvement of his psychical situation. Suggestion and hypnotism then are simply crude and more or less empirical ways of utilizing the dynamic principle of transference. This I shall develop later.

It may yet be asked why the resistance phenomena of the transference appear only in psychoanalysis and not as well with indifferent modes of treatment in institutions. The answer is that they manifest themselves there also, only they have not been valued as such. The breaking out of a negative transference is frequent in institutions as it is in all medical circles. The constant changing of physicians in ordinary practise is due to resistances. The patient leaves an institution or a physician, unchanged or subject to relapse, as soon as he falls under the sway of the negative transference. The erotic transference works less obstructively in institutions since there, as in ordinary life, it is attenuated and extenuated instead of uncovered. But it manifests itself quite clearly as resistance against healing, not because it drives the patients from the institution—it keeps back part of them—but in this, that they keep it. It is immaterial for the cure whether the patient in the institution overcomes this or that anxiety or hindrance, it is much more important that he becomes free from it in the reality of his life.

In the forms of psychoneuroses amenable to treatment the negative transference is found close to an affectionate transference directed often at the same time toward the same person, for which Bleuler has coined the excellent expression, ambivalence.[2] In a certain measure such ambivalence of feeling is normal, but extreme degrees are certainly characteristic of the neurotic or psychotic. With compulsion neurosis an "early separation of the opposites" seems to be characteristic for the instinct life and to represent one of its fundamental conditions.

[1] Ferenczi, Introjektion und Übertragung, Jahrbuch für Psychoanalyse, Vol. I, 1909.

[2] See Bleuler, Schizophrenic Negativism. Monograph Series No. 11.

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This is however but one side of the transference phenomenon. Another aspect must be considered. Whoever has received the right impression from these discussions, how the patient analyzed is hurled out of his real relations to the physician as soon as he comes under the dominion of the fertile transference-resistance, how he assumes his freedom then to neglect the fundamental rule of psychoanalysis that one shall tell everything without criticism that comes to his mind, how he forgets the purpose with which he entered upon treatment and how now logical connections and conclusions are indifferent to him, which shortly before made the greatest impression upon him, such an one will need to explain the impression by other causes than those given here, and such are in fact not far to seek. They are furnished by the psychological situation in which the treatment has placed the one analyzed.

In the tracing out of the libido lost to consciousness one is driven into the territory of the unconscious. The reactions which an individual carries out throws much light on the character of the unconscious occurrences, as is learned from the study of the dream. The unconscious impulses do not want to be recalled as the treatment would have them, but strive to reproduce themselves in accordance with the timelessness and hallucinatory ability of the unconscious. The patient reacts to the present and reality similarly as in the dream, to the results of the awakening of unconscious impulses; he would act out his passions without taking account of the real situation. The physician will urge him to enlist these feeling impulses with the treatment and in his life history, to bring them in order under careful consideration and recognize them according to their psychic value.

This struggle between physician and patient, between intellect and instinct life, between knowledge and desire for action, plays itself out almost exclusively in the transference phenomena. On this field must the victory, whose expression is the permanent cure of the neurosis, be won. It is undeniable that the subduing of the transference phenomena presents the greatest difficulties to the psychoanalyst, but one must not forget that just this demonstrates the invaluable service in making actual and manifest the hidden and forgotten love impulses of the patient, for no enemy can be slain in absentia or in effigy.

Before taking up the subject of negative transference there is one problem of positive transference which the beginning analyst *must* fully comprehend. *It is a subject met with in all fields of medi-*

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cine and is not unique in psychoanalysis, but psychoanalysis attempts to deal with it and inasmuch as it has its special application in the psychoneuroses by reason of the "floating libido," of which mention has been made, it should be understood. This type of transference *is almost universally* capitalized by the average physician. The situation is usually lightly alluded to under the euphemism "the grateful patient."

Here, again, as in so many other psychoanalytic problems, Freud has had the courage of his convictions and dealt with it.

This situation, which *it must be emphasized is only one of many,* develops not infrequently. It is the situation in which the patient betrays through minute or unmistakable signs or directly confesses that like any other mortal woman she has fallen in love with the physician who is analyzing her. As Freud has well said this situation has its distressing as well as its ludicrous side and it may also be said to have its serious side as well. It is at times extremely involved, depends on a number of different conditions, is occasionally unavoidable and always is difficult of solution. Its discussion is necessary in psychoanalytic technique.

First let me illustrate how a strong positive transference may almost forecast that this situation is going to arise. After all, the best technique endeavors to avoid it, and hence it must be handled early.

This patient, a young unmarried woman of twenty-five, was referred to me by a physician who told me "he did not know what was the matter with her. She was one of those nervous creatures who always made him tired." She had a timid shrinking manner, very quiet and furtive, low voice and gentle. She complained of palpitation and flushing, a sense of faintness, and had several ill-defined phobias with anxiety symptoms, chief of which was a sense of strangeness. She was much in need of analysis, was clever and intelligent and was very anxious to get well, in order not to be dependent upon relatives. She had been to many physicians.

I had seen her four or five times when she brought me a dream showing an implied criticism of a relative. It was a typical "mistress situation." On touching upon a certain aspect, which revealed concealment, she said: "Oh, I did not tell you a dream I had the first night after I met you. It was this:

"I thought I saw a picture of a man performing artificial respiration on an Egyptian mummy."

Associations soon revealed that I was the man; the mummy was

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a woman and she soon identified the mummy with herself, "her feeling of being all dead inside," "her feeling of strangeness." She wanted to be brought to life and the method of artificial respiration was not far removed in its motive from that which wakened Brünnhilde from her sleep.

It was apparent that this patient was revealing a strong early attachment, as yet unconscious, and, as in the position just outlined, What is one going to do about it?

To the laymen as well as the outside physician the affairs of love occupy a rôle above all others. Freud writes:[3]

"If the patient has fallen in love with the physician there might seem to be three courses open. A permanent, legitimate relationship might come to pass, though this would be unusual. Or physician and patient should at once separate and give up the work they had begun. The third course might not seem incompatible with the success of the treatment, namely a temporary illegitimate love relationship.

"The last is at once ruled out by general morality no less than by professional propriety, although there have been reports of such physicians who create such a situation by at once inviting the patient to fall in love for the sake of the treatment."

This is such a silly procedure as to be recognized as bad technique at once.

"The pursuance of the second named course merely necessitates a second analysis with another physician and a further repetition of the same situation. This course might appeal to interested relatives who neither recognize the necessity of the transference as a means toward the final cure nor realize that it is as certainly present in any sort of therapy, somatic or purely psychical, but concealed and unanalyzed in the former and therefore not contributing to recovery as psychoanalysis compels it to be. Such a breaking away from the analysis on the part of the patient would effectually reveal to the physician that the transference arose out of the neurosis and its analysis and was not based upon any personal superiority on his part.

"The physician, however, must see another course than either of these two mentioned possibilities. He must guide the patient to accept the falling in love as an inevitable fact. There is an important point, however, at which the erotic situation due to this cer-

[3] Bemerkungen u. d. Uebertragungsliebe, Int. Zeit. f. Aerzt. Psa., Vol. III, No. 1, 1915.

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tainly does not appear conducive to recovery. The love situation seeks to occupy all the patient's thought and attention. Interest in the symptoms is neglected. The patient suddenly even considers herself well, and the physician may be deceived as well until he comes to appreciate the condition that has arisen as in reality a manifestation of resistance. The former compliance of the patient, acquiescence in the explanations of the analysis, the understanding and intelligence, all are swept away while the patient is absorbed in her eroticism. The feeling of love, which has all along been present, is now being utilized to draw the analyst from the work of investigation. For this state of things arises just when a particularly painful repressed bit of life history needs to be confessed or recalled.

"The interplay of erotic feeling and resistances is very intricate. The unconscious would be satisfied by erotically overcoming the physician and would break his authority through his degradation. It cleverly intensifies the love and willingness to surrender in order to make this in turn something to be guarded against, therefore to justify the repression.

"A simple way out might seem to be for the analyst to place now before the patient the ethical demand with its necessity for renunciation and exaltation of the ego to the higher planes. Such a demand is however too great for the patient at this time. It would simply add to the former repression and create in the patient a feeling of scorn and desire for revenge.

"Yet neither can the analyst set himself upon a middle course of a moderated affection toward the patient without physical activities, until the patient can be brought to a higher plane. No one is sufficiently master of himself and of circumstances for such an uncertain course. The educational effect and ethical value of the psychoanalytic treatment is rather built upon absolute truthfulness toward the patient, which can therefore permit of no such temporary deviation from the true state of the case.

"The patient could not on the other hand bear an absolute and complete denial of all desires. The need and desire constitute the driving force for the work of analysis and transformation, and the physician must exercise care that these are appeased, though through a substitute. Actual satisfaction has long been impossible from the very nature of the malady.

"Any return of tenderness on the part of the analyst toward the patient would grant her what she demands, but destroy his authority

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over her in the problem of treatment and control of the neurosis, and so completely overthrow the success of the treatment. The goal of the neurotic would be attained, namely to make actual in life the phantasies and desires, which should have been reproduced only psychically for the analytical work. The hindrances and pathological reactions would accompany the love as it proceeded, but only to strengthen the repression finally without any correction of the same. Thus the granting of the love desires is as fatal for the analysis as their suppression.

"The analyst's course must be still another, a unique one. He must neither drive away the transference nor must he return it. He must firmly grasp the phenomenon as a temporary manifestation belonging only to the period of treatment, which must be led back to its unconscious sources, an instrument which will thus serve to bring into consciousness the most hidden part of the patient's love life in order to obtain mastery over it. There must be enough permission granted to the love to allow the patient to feel herself sufficiently secure to produce all the stipulations, phantasies and characteristics of her erotic desires, which lead the way into their infantile sources.

"There is of course a class of patients whose transference can never be lifted above the erotic demand and who can therefore acquire no interest in the treatment that will lead to success. From such the analyst can only withdraw.

"A true love leads to the endeavor to solve the problems of the neurosis because the analyst, the loved object, desires it. The patient wishes to complete the cure in order that she may become of value to the physician and also secure the reality in which the love may find constructive activity. The resistance, in contrast to such manifestation of love, makes the patient self-willed and refractory without interest in the treatment or regard for the earnest convictions of the physician. The erotic manifestation in which the resistance hides feels itself condemned under the conscientious behavior of the analyst, and the patient withdraws in hatred and burns for revenge.

"A necessary measure of forbearance, nevertheless, helps one to master the difficult situation and to utilize the eroticism to discover the infantile love objects with the phantasies built up about them.

"This love is moreover a real love and not a subterfuge on the part of the physician. The resistance has found it ready at hand and exaggerated its manifestations. But this makes it none the

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less a genuine love. Its infantile conditioning constitutes its compulsive character, which causes it to differ from so-called normal love. That too arises out of the infantile but has freed itself from dependence upon the original model and is therefore more pliable and capable of modification. The genuineness of the transference love must find its proof in the ability of performance, its value in reaching the goal.

"Its abnormal character was just as apparent before psychoanalysis was undertaken. The analytic situation merely shows it in action, while the resistances that arise force it into prominence. It is characterized by a disregard for reality, a thoughtlessness, an irresponsibility, and an overestimation of the love object, all of which appear in a greater degree than in ordinary love.

"The situation as far as the physician is concerned is simply an inevitable part of the treatment for which he must assume the responsibility as for any other professional confidence and trust, a responsibility that is only increased by the ready willingness of the patient. Technical as well as ethical motives determine his responsibility and strengthen his appreciation of the therapeutic value of this situation. The love is to be freed from its infantile fixations, not in order to be expended in the course of the treatment but to be preserved for the demands of real life for which the treatment is preparing the patient.

"All this is by no means easy of accomplishment. It cannot be denied that sexual love is one of the chief constituents of life and the successful combination of psychical and physical satisfaction a culminating point. Moreover, the higher love impulses acknowledged and manifested by a refined woman naturally attract and tempt the physician. But he may never forget that he is helping the patient over a critical period to a renunciation of the pleasure principle in favor of a higher goal of attainment, one psychologically as well as socially irreproachable. The transference is the instrument that leads her through the understanding of her early psychical history to that increase of psychic freedom which shall express itself in conscious productive activity."

The psychoanalyst deals with conditions that are not then without dangers. So also does the chemist handle explosive forces. I have seen surgeons cut into the brain tissue as if it were a piece of cheese. Such forces demand the utmost caution and conscientiousness. But psychoanalysis accomplishes a work that cannot be performed by mean of the paltry and not harmless means which it

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displaces such as so-called "rest in bed," diet, etc. It dares to handle the most dangerous psychic impulses in order to master them for the healing of those who are sick.

As Silberer in his masterly work on Mysticism[4] says:

"Where do the Scotch masters dwell?"

"Near the sun!"

Why?"

"Because they can stand it."

Transference and Resistance Symbols

A great deal might be said about signs of positive transference, but the analyst must always bear in mind the ambivalency of the unconscious as well as its egoism. A number of little indices may be recorded here. They are only suggestions.

There are literally thousands of apparently trivial things which show the internal workings of the patient's unconscious. Patients often come early. It usually indicates the positive side of the transference, just as persistent late coming points to the reverse. Sometimes the early coming is only a sign of extreme curiosity. It is frequent in the "little bird" type already discussed. Such patients often utilize the time spent in waiting to gain little impressions of the family life, assuming one's office to be in one's own home. These they will utilize as resistance symbols in the further analysis. In the office the patients will often move their chair closer to the analyst's desk. They frequently will tap with their foot an object in contact with the chair or person of the analyst. They will pick up objects which he is apt to use, play with the blotters, or toy with the office scissors or paper cutter. These small signs must not be unobserved, nor must too much weight be given to them.

Patients will constantly leave things after the hour, sometimes to come back immediately or as a sign of positive transference. Handkerchiefs, gloves, purse, books, papers, overcoat, cane, umbrella, glasses, etc. The type of object left is at times of special moment.

It is worth while observing the dress of the patients, particularly of the woman. It is at times plainly indicative of positive transference and may be the first indication of too strong a transference, which can be controlled, with the aid of the dreams, and hence the more difficult phases of the situation outlined on page 93

[4] Silberer, "Problems of Mysticism," translated by Smith Ely Jelliffe, Moffat, Yard & Co., 1917.

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avoided. It can also very easily point to negative transference and to resistances.

After working with some patients one may get very useful clues from the facial musculature activities. It is a well-known generalization and probably a very valid one that, in the unconscious, left and right play a very large rôle. I have made careful notes of the emotional expression of the face as well as other bodily movements, such as rocking in the chair, drumming on the table or the arm of the chair, the movements of the hand to the face, the presence of scratching, of crossing the legs, folding the arms, crossing the fingers, etc. After continued observation one registers a group of habitual actions which soon become very readily interpreted. The facial innervation however is the richest field for observation of signs of transference and resistance.

With more than one patient it has soon become apparent that the drawing up of the right eyebrow, the pulling of the face around to the right, the looking to the right, etc., were domination impulses from the unconscious and were "*complex indicators*" intending to convey the idea of conflict and resistance. Similarly other movements indicate positive transference situations and acquiescence with the general trend of the analysis. It is highly desirable to watch the facial musculature particularly when one is dealing with the most difficult of cases, the paranoid forms of schizophrenia, and the cyclothymic excitements and depressions. In many males the latent homosexual conflicts are often exquisitely registered by the facial musculature. Only in late stages of analysis, as a rule, can these deeply rooted and very unconscious "complex indicators" be used. I am not now speaking of the large group of facial tics, compulsive in type, which constitute difficult problems of themselves.

It is well known by those who have studied Darwin's and Hughes' extensive observations on emotional expression how intrinsic these observations may be, and the practical man of the street is unconsciously in touch with his fellow man through these means, infinitely more than he imagines. This close scrutiny of these factors is largely what goes by the term intuition, particularly in women, who unconsciously are always more on guard than men by reason of her chiefly subordinate rôle in the present social scheme of things. Long letters, frequent telephone calls, getting other patients, much discussion of their physician, these again are transference phenomena.

This introduces us to a topic already spoken of but which needs reëmphasis. The advice not to talk about the analysis to other

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people is quite essential. I repeat it here since it must often be reiterated to the patient. This is largely because the patient unconsciously will unload a great deal upon the confidant or person talked to, and comes to the analytic hour without a suggestion. On being asked, as it is usually the case that they are, What is uppermost in your mind to discuss? or What do you wish to talk about? or Are there any points to take up from the last analysis? such patients, who have been discussing analysis with their husbands or wives or friends, will answer, Nothing! In some subtle and unconscious way the important topics which will aid them to a valuable vision of the development of their conduct values have gone off in these side discussions. Hence the admonition to keep the discussion for the hour. This is particularly true in the early hours of the analysis. One should warn one's patients of course not to make any mystery of the situation. The rule is not one of the Medes and Persians and it can be broken, but on the whole it works better to have one's ammunition reserved for the psychoanalytic hour.

Certain resistance symbols also are classical. Coming late, as mentioned, is one. Delaying appointments and putting them off is another. The resistance is frequently converted into physical disabilities which make it difficult or impossible to keep the appointment. Dreams or other material written out are forgotten and left at home or are unaccountably mislaid or lost. Criticism and doubt of the physician appear not only in the dreams but are produced consciously in order to substitute an apparent distrust of his personal character, his sincerity of purpose or perhaps his financial uprightness in regard to the treatment for the unconscious unwillingness to acknowledge the sincerity and therefore the authority of psychoanalytic interpretation and the demands of its aim. Sometimes the finesse of the unconscious is extremely shrewd in manufacturing a host of little petty hindrances which successfully conceal the patient's resistances.

Another interesting type of resistance is the sudden cure. Stekel has called particular attention to this.[5] Another closely related type manifests a sincere doubt whether such fundamental treatment was best, whether it would not have been better after all to have remained at the level of compromise where the patient had had fair success before the analysis. Especially is this active with the typically

[5] Die Verschiedene Formen des Widerstandes in der Psychoanalyse, Centralblatt, IV, 1914, p. 610.

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doubting compulsive neurotic, particularly if his early religious training or his metaphysical convictions are interfered with.

Excessive or voluble speech in the hour whereby the more important things may be hidden or swallowed up is a frequent form of resistance. This is particularly noteworthy with certain paranoid individuals who wish to go into a host of intricate theoretical discussions concerning the psychoanalytic doctrines. A profusion of dream material, either in the number or elaborate content of dreams, offers this same manner of resistance. The patient then would dissipate the analyst's attention upon all the dream material rather than have him center it intensively upon one dream or one point. These are only other illustrations of the school-day trick of getting the teacher to talk about something else and thus avoid questioning. It is often very ingeniously accomplished in psychoanalysis, and my experience has emphasized the fact that I have fallen down, and other analysts have also, on this very point. The analyst can too readily forget his quarry and go off on an exhibitionistic flight of his own. Especially when he attempts to tell of his analytic successes is this liable to happen.

Some patients are full of the small details of the day. They elaborate them by the hour. These are resistance symbols usually. Others are those of elaboration of scientific or artistic theories. Interesting enough in themselves, and often recounted or dwelt upon for professed analytic purposes, they nevertheless not infrequently hide unconscious material.

A not infrequent unconscious ruse on the part of the patient and one to which the beginning analyst is particularly prone to fall, and sometimes it is not a fall, is the attitude frequently urged that because of the uniqueness or the extreme rarity or complexity of the patient's individual situation the analyst cannot possibly comprehend. He is inexperienced in this or that particular. He has not the same temptations or the same surroundings. The patient unconsciously plays for intimate knowledge of the analyst's own difficulties. This is very clearly brought out by many patients, particularly the "little bird" type. This inquisitiveness and curiosity leads them to create family situations. They may remark how the maid at the door has been rather brusque with them that morning; or they notice that there is a little careless dusting in the waiting room, or they inquire concerning the arranging of the books on the reading table, complimenting, by inference, the wife or some other member of the household. All this is frequently an invitation of

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one kind or another to get into a more intimate state of rapport. It is good technique to keep very quiet about one's self, to allow as little as possible of one's own surroundings to enter into any analytical situation. Occasionally the analyst is tempted to show, from his own dreams or situation, that he himself has had these conflicts, has made mistakes, has defects, and by entering into greater intimacy overcome some of the patient's resistances. Mutual trustworthiness is looked for, and Freud has well said:[6] "Where one seeks confidences one must be willing to show them." In some cases this may be desirable, but in my own experience it has nearly always proved costly. I have frequently to labor hard to regain ground lost. In general it is dangerous and one really gains nothing, since much more essential resistances develop to appear later and these tend to hold the whole procedure in abeyance. I think sooner or later I have regretted every personal confidence given. It is particularly in the unloosing of the transference that this technical error shows up to the greatest disadvantage. Freud calls attention to this in several of his papers, and points out how for some patients the analysis of the analyst becomes more interesting than their own. I have met with this in several cases. One hystero-paranoid type of patient was a marvel of ingenuity in her endeavor to get all of the small details of my home life and wherever she caught me napping I later suffered for my—even the slightest—indiscretion.

The ideal situation is to stick to the unconscious of the patients and simply reflect back to them what their unconscious shows. They must get to the point of faith in their own productions and be able to read themselves in the mirror that the analyst constantly keeps before them, as inscrutably as possible, and yet human.

In institutions where analytic therapy is used "it is not a serious fault; possibly, to admit some suggestive therapy admixture, but there should be no doubt in the mind of the physician that he is not practising psychoanalysis when he utilizes suggestive therapy."[7]

Very frequently the patients will seek instruction from the analyst. They will bring their troubles and their cares, their disappointments, discontents, problems, dilemmas, jealousies and misunderstandings. They will wish to talk of them and expect advice or suggestion as to their solution. In the handling of this particular type of situation psychoanalysis occupies an entirely different rôle

[6] Ratschlage für den Arzt b. d. psychoanalytische Behandlung, Centralblatt, II, p. 487.

[7] Freud, l. c.

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than most other types of psychotherapy. I can refer the analyst to a thorough study of this handling of the actual conflicts of the patient in a paper by Jones which is important.[8] The most successful mode of approach to this problem is to direct the patients' attention exclusively to the causes of their conflicts, not to advise how to handle them but to get the patients to comprehend how they arise. If the analyst gets into the exclusive rôle of the teacher and the adviser, his psychoanalysis is practically at an end and the patient will not have to have his resistances analyzed and will go on with his neurosis. The advantages of the psychoanalytic mode of approach are evident, as Jones points out. In the first place one is unable to point out the solution of a conflict until it has been analyzed. Either the patient already knows what he has to do, but is not in possession of the reasons why he is unable to do it, or he does not know at all what is the best solution of the problem. Possibly the physician can guess a correct solution of the conflict and give good advice, but what about the patient when a slight variant turns up? The position of a student who uses a pony with his translations is thus reproduced. He is unable to dig the thing out for himself and is helpless in a test. So it is with the patient who is advised what to do, and this constant seeking for advice is one of the most insistent cries that goes up day by day with neurotic patients. What am I to do? they ask. Give me something practical, they say, and the reply "Know thyself" is hard for the analyst to stick to.

While upon the subject of resistances, for the sake of completeness I would call the student's attention to a paper by Reik on this subject.[9]

Whoever has followed attentively the publication of the first analyses of hysteria,[10] from which psychoanalysis dates its existence, cannot overlook the significance of defense symptoms in the course of treatment. The theory of the resistance (and of the transference) which was developed from the observation of those signs of defense, showed itself even more clearly as one of the fundamentally

[8] Die Stellungsnahme des psychoanalytisches Arztes zu den aktuellen Konflikten, Zeitschrift, II, p. 6, 1914.

[9] Einige Bemerkungen zur Lehre vom Widerstande, Zeitschrift, III, 1, p. 12, 1915.

[10] Freud's Hysteria Analyses. A complete hysteria analysis is lacking in the English language. The editors of the Nervous and Mental Disease Monograph Series purpose to remedy this defect by publishing the full analyses of Freud's most important cases, for the translation of which they are indebted to Dr. A. A. Brill.

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recognized principles of psychoanalysis, and Freud first briefly stated[11] that this motive over and above the special results of the analytic work, has for him "remained decisive for his conviction concerning the etiology of the neuroses."

This factor of the resistance has received relatively little attention in psychoanalytic literature thus far, notwithstanding its great significance theoretically and practically. The following up of the rôle of the resistance during the course of treatment in addition to the symptom and dream analysis escapes a separate presentation, as every one will recognize who knows how many difficulties offer themselves in the description of a single completed analysis. The resistance drags itself through the analysis like a red strand as difficult to be separated from the whole structure as such a strand from a transatlantic cable.

The answer to the question how the resistance manifests itself may be read in all those obstacles which oppose themselves to the restoration of the patient's health and efficiency. This statement needs some qualification. For among the hindrances against reaching the goal mentioned there are also external ones, such as social and pecuniary circumstances, certain family relationships, definite conditions of external life. There is greater danger of overvaluing than undervaluing the significance of such circumstances alterable as they are only with difficulty, though they must not be overlooked.

The physician, to whom the patient complains of these circumstances, must for their valuation keep the following in view: 1. The fact that much distress, which at first sight seems undeserved, was brought about by the patient's unconscious wish, or at least its breaking forth was not prevented, although that was possible objectively considered. It must not be forgotten that the patient who finds himself in such a position would unconsciously divert the physician's attention from the true cause of the illness and on that account represents as its fundamental *cause* what is in fact the *result* of his neurosis. The patient, who goes on living under these conditions, will often maintain the neurosis for the sake of a secondary advantage obtained from the illness, for an unconsciously voluntarily invoked possibility. Reik gives an example. One finds no opportunity to earn money, although he seeks it with apparent energy and suffers much from an oppressive poverty. It must be accepted in this case—not always of course, but frequently—that the individual con-

[11] Zur Geschichte der psychoanalytischen Bewegung, Jahrbuch der Psychoanalyse, 1914, p. 5 f. Translation published as Monograph Series No. 25.

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cerned unconsciously overlooks many opportunities, indeed that he himself even with unconscious purpose spoils many opportunities. If one looks for the motive of such amazing behavior, one comes frequently upon the tendency towards self-chastisement, which flourishes upon an unconscious sense of guilt. It may be said that the over-valuation of such external conditions parallels the pre-psychoanalytic over-valuation of hereditary causes.

2. The psychoanalyst will cherish the expectation that the accomplishment of the analysis will clear away a large portion of these obstacles. The physician will without directly interfering by counsel or act in the circumstances under consideration patiently watch the time draw near when the patient, freed from his inner hindrances, himself takes the initiative and with insight and energy once more at his command brings about those changes which appear to him desirable.

3. The physician, to be sure, stands powerless before a portion of the external difficulties, objectively considered, yet he may console himself with the knowledge that their removal lies only in the sphere of influence of a higher instance, all-powerful fate.

Manifestations of resistance are to be found in all those obstacles which the patient opposes to his recovery. Attention has been directed to the most prominent difficulties of this sort, lack of associations, forgetting, and the like. The opposites, also, love of gossip and loquacity, as resistance symptoms, belong again to the question of the selection and censorship of associations. The physician, who at the beginning of the treatment bids the patient as the first and special condition of the psychoanalytic relationship, to tell everything and to allow no censor control of his associations, knows in advance that this condition will not be fulfilled by the patient. For rather the degree of departure from this ideal relationship becomes for the physician a sign of the greatness of the resistance. Over against the failure of associations stands oftentimes an excess of freely offered outspoken thought which would, like the first, lead the physician astray. The psychoanalyst must not allow himself to be taken thus unawares. He will suspect that such a wealth of association has the same purpose, to hide from him and keep from him just that which perhaps is necessary to the releasing of a symptom. He understands this just as he did the want of associations, which he knew served a purpose, representing the rising up of the resistance against painful confessions. The structure of the thought material in this case may be compared perhaps to a wide-meshed net, through

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whose interstices the most valuable slips away. It many cases it can be ascertained that the patient had the day before or the same day made note of a great number of incidents in order to relate them to the physician. The latter will not overlook the fact, however, that such gifts spread out upon a tray seldom bring that which one had desired. Generosity on the one side merely hides niggardliness on the other. Where such eloquence has already appeared as a resistance symptom an unconscious motivation may with great probability be suspected behind such a readiness, that it to say, the wish to defy the physician to drag on the analysis. Indeed it is plain that there lies often in such a state of things an unconscious ridicule of the physician, the infantile character of which becomes clearer, if one thinks of the grotesque tales of children which they relate to their parents in regard to the ostensible origin of children and in which the ridicule of the stork fable and the persons concerned in it manifests itself. The unconscious homosexual is particularly prone to this feature of the ridicule of the physician through his gossip and free discussion of small scandals.

Form, intensity, as well as the point of time when the resistance enters in the course of treatment Reik points out, vary so much that a classification of patients on this basis suggests itself. It may be observed, for example, that a bitter and persistent resistance appears later with just those patients with whom the transference was established quickly and easily and who apparently manifested no symptoms of resistance, while most cases where intense resistances toward the physician allow at first sight a limited outlook permit a favorable prognosis. One should begin to mistrust when "all goes smoothly" in psychoanalysis, when no resistances of any sort manifest themselves. One must be suspicious likewise of all those modifications of analysis which may boast of having diminished the resistances or set them aside. Psychoanalysis may be compared to the work of a machine, for the efficiency of which the presence of friction is an indispensable condition.

Reik calls attention to more or less direct manifestations of resistance such as outbreaks of anger against the physician or a third person. The passage from one form of resistance over into another may be observed daily in the analysis. It happens indeed that the form of the resistance changes with the taking over of a patient into the treatment of another physician, a practice principally to be avoided. Thus a patient displayed his resistance against the physician who was treating him in continually complaining that the doctor

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and his method did not interest him, that what he said was a matter of indifference and wearisome. He, the patient, stood toward him with a feeling of distant respect which frequently passed over into a feelng of superiority. After a visit on one occasion to the consultation room of another psychoanalyst the resistance prepared for itself an elementary path in which the patient characterized this second physician immediately on leaving his house, as a "disgusting Jew" and complained of his so-called hardness and heartlessness.

Concealed forms of resistance phenomena are however the more frequent. Thus Abraham reports a patient whose resistances had created a very interesting esthetic mask. The patient evinced frequently during the hours of analysis a strong displeasure in the objects in the consultation room. He found this piece of furniture out of place, that arrangement in poor taste and so on. Naturally the form and content of this, as of all resistances, is psychically determined and over-determined and an indicator to the analyst. The whole sum of the neurotic resistance is learned first of course through dream and symptom analysis; in these creations frequently there hides a flood of most malicious wishes and insults directed against the physician. This illustration of Abraham I have had repeated over and over again with my books, my rugs, my ornaments, my clothing, etc. One patient hides a frightful snobbery clothing complex behind a criticism of my clothes. Other infantile superiority motives are the rule in resistance situations.

Just as Abraham's patient found an opportunity for directing his resistance toward the physician in an exasperated criticism of the arrangement of his house, and others in the manner just mentioned, so also it happens that the resistances find their objects in the relatives and acquaintances of the physician. The parallel to the relation of primitive people thrusts itself forward here, as Reik emphasizes. The savage who wishes to injure some one possesses himself perhaps of a bit of property of the person under consideration and believes that through the medium of this object he will also have power over its owner (contagious magic).[12] If the savage believes himself injured or wronged the law of tribal revenge comes into play, to which not only the person who committed the deed but his relatives and friends as well must submit. The criticism of the physician's furniture and the ill-will toward his relatives is analogous to this state of things. Reik speaks of a patient where the dissatisfaction of the patient with his physician was manifested in this fashion, that he

[12] See Zenia, X., *Psychoanalytic Review*, Vol. II.

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began the hour of analysis with railing against the incivility and stupidity of the maid servant. One difficult patient of mine always revealed his resistances by ringing the front door bell two and even three times in quick succession while waiting to be let in. His "Jehovah complex" admitted of no delay in letting so important a person in the house. I was never quite able to have him see his hatred—resistance—through this apparently trivial incident. Yet it was apparent in every detail of a busy and, commercially speaking, successful life. He had a very bankrupt soul, however.

Reik also emphasizes the analogous variations of the means of transference, such as great interest on the part of the patient in the members of the physician's family, inclination toward them and great respect, behind which often, especially with female patients, lurk unconscious death wishes. Reference must repeatedly be made to the fact that the patient creates for himself in his relations with the physician a return of infantile situations. The infantile Œdipus situation is thus completely reëstablished—just as the physician appears as the revival of the father, so his wife is often the mother—when a strong love toward the wife or the daughter, whom the patient has perhaps never seen, joins itself to the neurotic's resistance against the physician. Moreover strong feelings of jealousy against the physician's sons may be looked upon as a return of childish impulses, brother jealousy. In one of Reik's cases the patient complained with strong affect of the behavior of another patient quite unknown to him, whom he had met in the physician's waiting room. This analysis revealed that behind these complaints were hidden reproaches against the physician, who seemed to give preference to the other patient as once the father had favored the brothers of the later neurotic patient. It often becomes clear in the analysis with what the resistance, which announces itself in the lack of associations or in the repression of their disclosure, concerns itself. There are at work besides the shrinking from the confession of unpleasant things and those which would wound the ego of the patient, definite hostile impulses against the physician. In certain cases the increasing silence in the analysis signifies directly the unconscious self-punishment for evil wishes against the physician. A very intellectual woman, suffering from a compulsive neurosis, once offered the information spontaneously that her becoming speechless really represented how she died.

In a preceding page of this book I spoke of the free patient in psychoanalysis. Reik also discusses it in the paper just referred to.

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He regards it as deserving a special chapter. The refusal on principle of the free treatment which Freud recommends[18] rests also on this, that the free treatment under certain conditions produces a special heightening of the resistances. Gratitude prevents the patient from manifesting his resistances in the same form and with the same intensity as the other patients. The location of the resistance must then be sought out with difficulty by the physician and discovered. He meets then among other things the haughtiness of the young man who will allow so very little to be given him by the physician, as once by his father, and also the distrust toward the physician, which reveals itself in the anxiety that he will not be treated by him with the same care as other patients blessed with this world's goods.

Reik gives examples which may be duplicated in any psychoanalytic treatment. The physician is prevented some time from keeping the hour for analysis and writes to the patient to break the appointment. The next interview brings surprisingly great resistances not justified by the things which are discussed. The patient has understood the breaking of the engagement as a sign of unconscious depreciation and brings it into connection with the free treatment. His narcissism takes the occurrence as a humiliation and to this actual disturbance is to be ascribed the increase of resistances. Naturally the feeling of shamed love (unconscious homosexual) contributes essentially to this effect.

Reik speaks of one form of resistance phenomena. This is the "proofs" by which the patient will convince himself of the reality of psychoanalysis. Many patients after a significant explanation on the part of the physician immediately make proof of an example as it happened to that patient in Freud's "The Interpretation of Dreams" who reacted to the information given as to the theory of the general wish-fulfilling tendency with a negative wish dream. As an example we may suppose that the patient has just discovered a bit of the motivation of his chief symptom, psychic impotence. He hastens now to find the opportunity for sexual intercourse and suffers failure at coitus. He has through this merely given expression to his unconscious resistance against that explanation, to which he perhaps some hours before had heartily agreed and which he consciously received almost as his salvation. On the other hand the more favorable case may be adduced. Coitus succeeds and the full capacity for satisfaction is this time again established. There must

[18] Weitere Ratschlage zur Technik der Psychoanalyse, Internationale Zeitschrift für ärztliche Psychoanalyse, 1913, Heft 1, S. 8 f.

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then be considered a transference result, which the first disturbance of transference again destroys.

E. Jones[14] has said all that is essential concerning the mistakes which the psychoanalyst would commit if he interfered in the actual conflicts of the patient through advice; for example: It might be taken for granted that the advice of the physician would be suited to solve an actual conflict, yet the wished-for result might not appear. Then the patient's resistances will again appear in the unconscious; he will perhaps meet with some misfortune in the carrying out of the advice, he will keep strictly to the letter of the advice and miss its intention or unconsciously perhaps he will prefer some modification, which complies with his secret wishes. The failure in outcome will then be utilized for the increase of the resistances while the blame will all be laid upon the physician. Often, moreover, a tertiary advantage enters in for the illness just through such giving of advice, for the transference becomes permanent, the patient will no more dispense with dependence upon the physician and remains sick in order to justify this relationship.

Then the phenomenon, well-known to psychoanalysis, of the "haughty obedience" comes to light. The patient slavishly follows the instruction of the physician but expects him to uphold, it may be, the manner of life created by the advice. Reik speaks of certain patients who behave in their "passive resistance" just as do the German railway officials. There exists in the regulation of the German as well as of other railways a number of instructions and commands, the invariable carrying out of which into practice would paralyze all traffic. There is therefore a tacit agreement between higher officials and subordinates to overlook these orders at times and to keep traffic going according to other more practical rules. If now the railway officials and workmen have cause for dissatisfaction with their wages, hours of duty, etc., they adopt a "passive resistance," that is, they maintain a strict adherence to the instructions of the rules in their work and bring about, through this grotesquely unjust kind of officially demanded strike, serious disturbances in the regular traffic, even not infrequently a complete standstill.

The last—often very difficult to overcome—resistance in the treatment is the final doing away with the transference. The patient strives by all means of defiance, yes, of hatred, against turning his love away from the physician and placing it upon others.

I must not neglect this opportunity to emphasize an important

[14] L. c.

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notive to which Reik also refers. An actual obstacle to the setting up of the transference may present itself according to the manner in which the psychoanalyst takes note of the neurotic's complaints.

In Reik's own words: "Suppose that a nervously sick woman comes to a neurologist and complains that she is pursued by a compulsive thought, that she must poison the husband she tenderly loves. The conflict which this temptation toward feelings directed against her husband arouses, causes her constant suffering. What attitude would most neurologists take to such a case, a by no means rare one? They will listen to her tale with grave shakings of the head, and then attempt to talk the poor woman—supposedly she has shown herself mentally sound otherwise—out of her compulsive idea, while they would perhaps say: "But that is nonsense. Dismiss it from your mind. Try with all your might not to think of these things. Find distractions, go to the theater, to concerts, travel, and the like."[15]

It needs only to be mentioned, through a reference to the impossibility of dismissing it from the mind, how such a therapy ridicules itself, and does not understand how. The psychoanalyst who has listened to the patient's complaint will express himself something like this: "Now, that is very interesting. Tell me, please, when this idea first appeared to you, in what connection, and so on." In a word, he will not shove the compulsive idea to one side as unpleasant and senseless, but take it for granted, on the contrary, that a definite meaning belongs to it in the patient's mental life, that it has some connection with her experiences, wishes and conflicts and that the problem will be to ascertain the psychic motivation and the latent meaning of the idea.

The comparison of the psychotherapeutic effectiveness of the two methods is not now under discussion, hence for the moment the stress will only be laid upon the effect upon the patient herself of the taking up of what she has imparted. While the telling of her idea heretofore has always met with a depreciation of it, at the very least with an ironic or slight smile on the part of the physician, on the part of the psychoanalyst she finds understanding as he accepts the idea quite earnestly, believes in its meaning and its significance and occupies himself with its origin and development. Here, however, with

[15] Other methods will direct their measures to this end, that the idea be recognized as completely foolish. It may be desired to set it aside by hypnotism and Dubois would not leave out the ethical stimulus and strengthening of self-confidence.

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this serious acceptance, the first actual possibility of the transference arises. The patient is wounded in her narcissism through the slighting or depreciation of her idea, yet the attention which the psychoanalyst bestows upon all her manifestations and symptoms, even the most absurd and bizarre, works beneficially although it flatters her self love. It must not be forgotten that patients can consciously observe and curse their ideas and symptoms as foreign to them or comprehend them unconsciously as products of their own personalities and care for them perhaps with the love with which a mother devotes herself to a crippled child. The neglect or the depreciation of a symptom or anything brought by the patient, which perhaps announces itself in the relinquishing of the usual amount of attention, would therefore mean a two-fold technical error on the part of the physician. The result would be not only a loss of psychological knowledge but also an increase of resistance due to the wounding of the patient's narcissism. This neurotic narcissism shows itself in a certain valuation of the patient's own illness, by which he grants to his own illness an exalted position, will not see the typical character of his neurosis in connection with other cases, but considers his as a distinctive special case which demands increased attention.

A factor of the greatest importance and one that is well known to all physicians who practice analysis concerns itself with the analyst's own negative transferences. I have made special note of these as illustrated in the persons assisting me in psychoanalytic work. It is remarkable how in the course of an analysis one hears of the "difficult" patient. The use of such a concept usually means an opposing force on the part of the analyst. It is only all too deeply grounded in the human soul as Reik well says, that a feeling of impatience and anger takes possession of the physician especially at that point when the severe resistances rouse themselves against him. The danger is particularly at hand when the treatment through the intensive resistance of the patient has reached a "dead lock," that the feeling of dissatisfaction over the temporary standstill and over the obstinacy of the patient strengthens itself even to a negative resistance, which manifests itself in a withdrawal of interest in the patient or even produces a change in the manner of treatment. The consequences of the existence of such a negative resistance upon the progress of the analysis would naturally be most unfavorable.

Freud tells us through what psychic mechanisms resistances arise. It might be pointed out on what basis they rear themselves and to what instinctive impulses they owe their strength. Reik speaks of

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three chief components that work together to constitute the resistance; narcissistic, hostile and closely bound with them, homosexual currents and anal erotic tendencies.

1. The beginning analyst will soon commence to appreciate the significance of the narcissistic attitude and its disturbances for the question of the resistance. A partial derivation of the resistance from narcissism becomes clearer when the inner relation between repression and resistance is understood. Primary narcissism contributes to the ideal ego structure. This becomes the condition of the repression on the part of the ego.[16] Through analysis, however, the comparison between the actual and the ideal, always present in the unconscious, is transplanted to the soil of the conscious. The conflict between the tendencies directed toward and against the ego is again, under changed circumstances, taken up, whereas before through the compromise formation of the neurosis it had come to a truce, which was however repeatedly disturbed. The physician becomes to the patient the unconscious incarnation of that censor which is in conscious phraseology called "conscience." This deduction can also be supported genetically, since conscience is primarily based on parental criticism and guidance and the physician comes to be for the patient the revival of the authority—father or what not. The patient naturally strives against the constant comparison between the actual and the real, to the conscious carrying out of which the analysis compels him, while it shows him how his conscious intentions and deeds measured to the ego ideal are continually disturbed through the unconscious events belonging to his actual ego.

Those numerous cases of neurosis in which the "castration complex" appears in the pathogenesis, hold a special position. The resistance of the patient assumes a character as if the physician represented the father in his part as sexual meddler and intimidator. This fear may find support in the unconscious memory of the father's threat of castration for infantile over-interest in the child's own member. If one follows further the castration anxiety directed toward the physician, forbidden (for example, incestuous) wishes come regularly to light. The child has unconsciously incorporated the characteristics of the father in his ideal ego in so far as the comparison of the child oppressed by his dark instinctive forces with the father offers an obstacle to the formation of his ego ideal. So the physician as the father representative (social necessity, etc.) comes

[16] Cf. Freud, Zur Einführung des Narzismus, Jahrbuch der Psychoanalyse, 1914, p. 17 f.

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to be the external ego ideal. A great part of the transference situation must find its explanation here. The resistance, considered from this point of view, may be described as the striving against the discharge of homosexual libido values.

2. Hostile currents against the physician in the form of resistance are conditioned through the revival of those feelings once belonging to the father. The typical attitude of the individual toward the father however is ambivalent, so the hostile tendency has continually to strive with the tender one, the unconscious continuance of which produces homosexual feelings. The intensity of the hostile feelings directed against the physician is reactively strengthened through the defense on the side of his own homosexual onset of libido. The resistance presupposes also properly a portion of the result of that psychic mechanism, which Freud's analysis uncovered especially in the paranoic forms of disease,[17] the reaction to the endopsychic perception of one's own homosexual tendencies. Resistances here therefore become defense measures which arise from the fear of temptation. Their purpose is to assure the male patient against his homosexual, the female patient against her own heterosexual impulses.

The fact that the resistance grows in more than one point directly out of the transference and its psychic resulting phenomena has been stressed again and again. Reik also speaks of it. Thus, he says, the patient seeks, after an extensive transference has been set up, to win the unconsciously loved physician to himself, he will impress him, show him his best side. The analysis hinders him in this, because it compels him to confess just those things through which, according to his opinion, he will fall in the estimation of the physician. Resistances, as they manifest themselves perhaps in suppressing of incidents, may often be interpreted definitely as signs of homosexual and narcissistic tendencies of the libido. The relationship of this to consciousness of guilt can be easily established, thanks to Freud's explanations:[18] The want of satisfaction through the nonfulfilment of the narcissistic ego ideal frees homosexual libido, which is changed into consciousness of guilt. "The consciousness of guilt was originally fear of the parental punishment, more correctly of the love desire associated with the parents . . . " [Freud]. The neurotic shows in the form of resistance we have described regressively

[17] Cf. Freud, Psychoanalytische Bemerkungen über ein autobiographisch beschriebenen Fall von Paranoia (Dementia Paranoides), Kleine Schriften zur Neurosenlehre, 3 Folge, p. 251 f.

[18] Zur Einführung des Narzismus, p. 24.

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this psychogenesis of the consciousness of guilt, since he is unconsciously afraid that his confessions may have as a result with the physician the desire for love.[19]

3. The third feature to which Reik calls attention, and only touches upon, concerns residual phenomena, regressive revivals or reaction formations of the infantile anal erotic. Freud[20] and Jones[21] have vigorously drawn attention to the inner connection of anal erotic and hostile impulses. It seems that a certain relationship exists between the neurotic restraining and repressing of affect and the infantile pleasure in retaining the excrement.

Reik attempts to define the special form of this relationship and the finer mechanisms which bring these two processes together. It seems to him certain that those two characteristics, which Freud has noted as constantly bound with the anal erotic character,[22] avarice and obstinacy (as intensifications of frugality and self-will), must claim a place in the structure of resistance symptoms. Whoever has once carried through an analysis will have met during its course with those neurotic manifestations of obstinacy and had opportunity to observe the stinginess of the psychoneurotic in the form of a resistance to giving out the unconscious material.

The patient revives regressively in his resistance his strife against every person of his childhood who compelled him to renunciation of pleasure in infantile sexual activities and phantasies. Thus the analysis becomes a condensed recapitulation of the living through of those important inner conflicts which the patient would escape through flight into his illness.

It has frequently been noted that the neurotic resistance phenomena like other neurotic symptoms are fitted for the character of a compromise, as Reik happily illustrates. "In the production of their symptoms and of the resistances directed against their removal it happens to those who are neurotic just as with the hero of one of the unjustly forgotten parodies of Nestroy. His tenderly loved one

[19] The state of affairs with a compulsive neurotic patient of Freud furnishes a beautiful example of a resistance conditioned thus. Cf. Freud, Bemerkungen über ein Fall von Zwangsneurose, Kleine Schriften zur Neurosenlehre, 3 Folge, p. 159.

[20] Die Disposition zur Zwangsneurose, Internationale Zeitschrift f. ärztl. Psychoanalyse, 1913, Heft 6.

[21] Hass und Analerotik in der Zwangsneurose, Int. Zeitschr. f. ärztl. Psychoanalyse, 1913, Heft 5.

[22] Charakter und Analerotik, Kleine Schriften zur Neurosenlehre, 2 Folge, p. 132 f.

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had once sent a beautiful walking stick as a gift to the young dreamer. The fickle maiden became untrue to him, and the poor fellow, crushed by this fate, wandered through the country as a destitute musician. Still as an aging, embittered man he always carried his staff along with him. Asked once what was the reason for this he answered: "I carry this stick in order to keep forever in mind a person whom I wish never more to remember."

I have previously spoken of Ferenczi's contribution to the subject of transference, and inasmuch as he discusses the highly important questions of suggestion and hypnotic rapport in this same paper his ideas properly belong here.

Numerous illustrations have already been given of the means taken, chiefly by the unconscious of the patient, by which they may escape insight into the various factors at work in their conflict. The transference-resistance (ambivalent hate and love) falls upon the physician who is carrying out the analysis. It must be repeatedly emphasized that these phenomena are not restricted to psychoanalysis, nor are they related necessarily to physicians. They are the results of fundamental mechanisms and thrust themselves into every situation in life. Practically every novel or play ever written, and which is a true work of art, as distinguished from the run of pot-boilers, is a clinical exposé of these factors, all the more penetrating in proportion to the genius of the artist. The works of George Eliot, Thackeray, Dickens, Meredith, not to mention hosts of others are replete with illustrations of the various points we have been discussing.

There comes to my mind now a pathetic picture of a New England school teacher, trivially wounded in the back, who has maintained a lifelong invalidism—and a most fascinating and charming invalid she is—in order (unconsciously, of course) to be cared for and supported by an equally charming and idealistic old bachelor. This unconscious love relation has existed now fifty years and neither of the principals has a ghost of a notion of the real situation. The neurosis has to be maintained. Similar situations are met with in everyday life on every hand.

Every one is familiar with the numerous food eccentricities of people, which in their more exaggerated forms we so frequently stigmatize as hysterical. The desire for indigestible things, or unusual things, for certain preferences and aversions which may be related to the form or consistency or the smell of food. Many of these are readily and sometimes quickly traced to their infantile be-

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ginnings and usually run down to displacements of the repressed auto-erotic inclinations to the mouth—as has been illustrated by the "sausage" already mentioned. As Ferenczi aptly puts it, the treatment, by the gradual bringing of these repressed impulses to consciousness, offers a most favorable condition for transference of these unsatisfied values upon the physician.

"The analyst acts as a katalytic agent, which, in the decomposition that takes place, draws the separated affects upon himself. This is, however, only a decoy, as it were, to lead the patient's interest back to the original buried sources and to establish a permanent connection with them."

Ferenczi emphasizes the highly important point upon which I have dwelt at length earlier in these pages. A physician simply because of his being a physician stands in a specially favorable position for the transference. In the first place he stands for the protective factors in the patient's unconscious and secondly, it is well recognized that the physician is regarded, from the standpoint of the infantile sexuality, as one who knows the forbidden and looks upon and touches what is concealed.

It is a singularly striking fact that the dream material is so rich in these transfer phenomena relative to physicians and the beginning analyst must be particularly careful in his judgments concerning this transference material which is constantly appearing as directed upon previous trusted general or special practitioners. The analyst finds himself frequently substituted for formerly employed laryngologists, rhinologists, gastro-enterologists, gynecologists, etc. These physicians have in their turn been objects of unconscious sexual impulses which have been, mostly, repressed. They are now revived in new phantasies attached to the analyst. The latter, who should understand these phenomena, should eliminate the ever present infantile tendency to wish to criticize his brother physicians on the basis of the evidence derived from these phantasies, and moreover, he should not get disturbed when his equally infantile but not so knowing brother physician roasts him on the spit by petty innuendoes or veiled slander.

It is particularly futile for the analyst even to revile in his heart, let us say, the gynecologist whose genital manipulations are recognized from the patient's dreams to have been sources of auto-erotic gratification. It may be quite clear to the analyst why his gynecological confrere failed to effect a cure of the neurosis. But the gynecologist should not be blamed for doing something which, unconscious to

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himself as well as to his patient, had been a means of continuing, not curing the neurosis, because from lack of psychological insight he was not aware of what was really going on. It is all the more a matter of extreme importance for the analyst, who is supposed to know what is going on in the unconscious, to avoid the very selfsame faulty treatment although the manipulations may be symbolic rather than manual.

The amazing ingenuity of the repression side of the unconscious to make plastic modifications of the symbols whereby secret gratification may still be retained is almost beyond belief. If the patient fails to get well or to radically improve, under the analyst's care, he must put it down as a fact, from which no amount of rationalization will let him escape, that he is failing to perceive his own infantile fixations and is committing, in minor or major degree, under different symbols, the selfsame faults, so far as recovery of the patient is concerned, as the reviled gynecologist, internist, gastro-enterologist, etc.

This selfsame lack of sympathetic insight into the difficulties leads to numerous futile recriminations between physicians, which are unmistakable indices of failure. They point to the fact that the libido is not being used to comprehend. The old aphorism that "negation is a sign of the small mind" has its inception in the recognition of these psychological events. In similar vein is Leibnitz's well-known attitude when he writes in his "Monadology" that "he read books to find out what he could get out of them rather than what he could find to criticize in them."

In this connection, we are led to the subject of the analyst's resistances, not only to brother practitioners, but more particularly to other analysts. The situation frequently arises when the analyst is asked to give his opinion relative to other analysts, as well as other physicians. I am in the habit of answering this question by prefacing it with the well-known statement of Protagoras already elaborated in these articles "That truth and reality are to each man as he perceives them." Any opinion of mine, therefore, would be of value solely to myself and as helpful in resolving my own conflicts with reality. They can have no specific value for any one else with different conflicts and different settings. I frequently illustrate my meaning by referring to some like or dislike, of my own, relative to some article of food, some work of art or some musical composition. My opinions concerning them are purely individual and personal. So it is with Dr. So-and-So. He is a purely personal ex-

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perience for each individual. He will prove his own value and my own ideas concerning him are more a product of myself than they are a value of him for you. They are purely personal reactions and adjustments and have no particular value for other people and for other adjustments.

It must always be borne in mind by the analyst that one's criticisms of others is usually a revelation of one's own conflicts and weaknesses, which the unconscious of the patient will grasp, retain, and utilize as a resistance to the getting at their own conflicts.

Ferenczi still further calls attention to the hetero- and homosexual unconscious phantasies. If the physician is a man the unconscious heterosexual phantasies of the women patients are attached to him and serve to accentuate their repressed complexes. Every one has homosexual components as well and so he may positively arouse the male patients to sympathy and friendliness or, negatively, give rise in them to antipathies and dislikes. Feminine characteristics in the physician can stimulate the homosexual in the woman or heterosexual in the man and be a basis for transfer or resistance phenomena.

The neurotic is constantly in search of objects upon which to transfer his feelings, and for those particularly who can be *drawn into the circle of his interest*. Ferenczi utilizes a special term for this, *introjection*. He contrasts it with the typical paranoid mechanism of *projection*. As a result one finds the contrasting types. The broad-hearted, sympathetic, excitable neurotic, easily aroused to hate or love towards the whole world, and the narrowed, distrustful paranoic, thinking himself pursued or loved by every one. The psychoneurotic suffers, as Ferenczi puts it, in the expansion of his ego, the paranoic in the contraction of his. Both of these end results are obtained through exaggerations of perfectly normal mechanisms.

We have already spoken of the supposed dangers lurking in the transference. Possibly there are. I am not yet in a position to say. Ferenczi is one who denies any harm can come from the transference. I am disposed to agree with him, if one can be certain that the transfer is going to be rightly handled by a conscientious analyst.

There is danger in morphine and the surgeon's knife, but their use is not denied because of this. One must comprehend the agent in use. Without a proper handling of the transference successful therapy, although it may occur, is a hit or miss performance.

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Ferenczi maintains that only the positive feeling towards the general physician is recognized, because as soon as an unfriendly transference arises the patient separates from the physician, the positive transfer is overlooked by the unsuspecting physician and the successful issue of the treatment is ascribed to mechanical means, to pharmacotherapy, to osteopathy, Christian Science, or to suggestion. Neurotics almost invariably treat themselves by psychotherapy —by transference. Introjection is a self-taught mode of healing. The patient uses the method if he comes to a well-disposed physician and attempts to transfer. If he succeeds improvement results.

This, the natural way, accounts for many of the successes, partial at least, which are undoubted under *every* form of therapy, one might say, *any* form of therapy from downright charlatanism to the most approved orthodox forms of medicine taught in the schools. It is not necessarily, however, the right way, or the best way, for as a rule the repression, displacement and transference, which the neurotic uses, do not *ultimately* succeed. Fully fifty per cent. of the neurotics and fully as many of the psychotic cases which I have investigated in the past eight or ten years were once "cured" by operations, by hydrotherapy, by Weir Mitchellism, etc. Their early conflicts were repressed through their early transferences to the many physicians who treated them, but the attempt at radical healing was essentially unsuccessful. They made very costly substitutions which, in later years, have destroyed them in part or totally.

Psychoanalysis, Ferenczi well says, must individualize what nature spurns. The natural way does not always succeed. Psychoanalysis seeks to make the individual capable of life and activity, whom nature, indifferent to the feeble individual, would, through the repression, summarily destroy.

It is not enough to displace a little further the repressed complexes by means of transferences to the physician; to relieve in part the affect tension, and to reach a temporary improvement. The patient must, by help of an analysis, come to the point where he will overcome resistances which prevent the sight of his own unadorned psychic physiognomy.

One hears much of the value of suggestion and hypnotism in psychotherapy. The real basis of their value consists in their relation to the phenomena of transference which we have been discussing, hence they might be taken up here.

On this point Ferenczi's studies are of much interest and value, and I purpose giving a full abstract of his important paper since it

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clears up many of the phenomena known to the earlier stages of hypnotic psychotherapy and casts an illuminating light on psychotherapy in general.

The phenomena of hypnotism have not been sufficiently explained either by the Parisian school—Charcot—or by that of Nancy-Bernheim. The former considered peripheral and central stimuli, visual fixation of objects, stroking of the head, etc., as the chief factors. The latter considered such means as only the vehicle for the introduction of ideas, particularly of the idea of falling asleep, which would then permit a condition of dissociation of consciousness which would produce a susceptibility to further suggestions.

Though this was a decided advance in the scientific treatment of the question of hypnosis, it did not actually explain the process of hypnosis. The external means seem inadequate to produce such profound changes in the human mind as result in hypnosis, nor does the introduction of the idea of sleep into the mind of a waking person seem sufficient to cause the necessary condition without some further aid. Everything seems to point to the conclusion that in hypnosis and suggestion the chief actor is *not the hypnotist or the person offering the suggestion but the patient, himself,* who has hitherto been looked upon merely as the "object." The existence of autosuggestion and autohypnosis, as well as of limitations in each individual to the ability to be hypnotized, seems to point to the same conclusion.

Psychoanalytic research has, however, given an insight into the mental processes which take part in suggestion and hypnosis. It has confirmed the opinion that the hypnotist "is relieved of the trouble of calling forth the condition of dissociation," for this condition, the existence of different layers of the mind, has been discovered to exist even in the waking state. Besides this, psychoanalysis has given us undreamed of knowledge of the content of idea complexes and of the direction of the affect, which constitute the active, unconscious layers of the psyche in the process of hypnosis and suggestion. The instincts repressed in the course of development are stored up in the unconscious and their unsatisfied, stimulus-craving affects are ready to transfer to any persons or objects of the external world, and to bring these unconsciously into relation with the ego, that is to introject. With these facts in mind it can be readily seen that the unconscious psychic forces of the subject appear as the active agent, while the hypnotist, once considered all powerful, becomes only the object of the apparently unresisting subject.

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The prominence of the parent complex among those that become fixed in the course of childhood and its fundamental importance in all psychoneuroses, is readily seen in the hypnotic phenomena.

But it has already been emphasized that there is merely a quantitative difference between normal and psychoneurotic psychic processes. Therefore a suggestion given by the hypnotist to another would set in motion the same complexes which are active in the neuroses. This is not simply an *a priori* hypothesis, but actual experiences in psychoanalysis prove it.

The resistances upon which one comes in the analysis, and which temporarily retard the work of analysis, are shown in time to be reactions to an unconscious feeling of sympathy, which properly belongs to other individuals but is in actuality directed toward the analyst.

Sometimes the feeling of the patient amounts almost to adoration of the physician, again hatred, fear, anxiety toward the analyst seriously disturb the analysis. These all, in the unconscious, refer to various personalities in the life of the patient, of whom the patient is not then thinking. Thus the physician represents the whole series of persons to whom these affects, positive and negative, properly belong, and in the course of the analysis the affects are gradually traced to their source. There come first, those related to individuals in the direct past of the patient, then unattached affects from the period of youth, phantasies concerning friends, teachers, heroes, and at last, after great resistance, those due to repressed thoughts of sexual, violent and anxious content, which are concerned with the nearest relatives, especially the parents.

These things establish the fact, Ferenczi says, that in every human being there lives again the love-craving, therefore fearful, timid child, and that all later love, hatred and fear are transferences, or as Freud says, new impressions of the feeling currents, which were acquired in early childhood (before the completion of the fourth year) and later were repressed.

This knowledge encourages one in the belief that the remarkable power, which the hypnotist exercises over the psychic and nervous resources of the subject, merely brings to light the repressed infantile, instinctive impulses.

It has long been recognized that sympathy and respect favorably influence the receptivity of the patient. But what was not recognized without the help of psychoanalysis is the fact that these unconscious affects play the chief rôle and also that in the last analysis

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they are manifestations of unconscious erotic impulses, which are for the greater part transferred to the physician from the complexes arising out of the relations of the child and its parents.

The importance of sympathy and antipathy between hypnotist and subject has been generally recognized, but not the fact that they belong together and are psychic structures capable of further separation into their elements. Their analysis reveals primary, unconscious erotic wish-impulses as the substratum upon which an unconscious and fore-conscious psychic superstructure is built.

The earliest layer in psychical development is that of the pleasure-pain principle, the compulsion toward direct motor gratification of the libido. This, following Freud, in part, is here called auto-erotism. This can scarcely be reached in the adult by reproduction, it must be studied from its symptoms. The stage of object love, however, can be reproduced. The first love objects, moreover, are the parents.

All this leads to the assumption that an unconscious sexual attitude lies at the basis of every feeling of sympathy, and that when two individuals, of the same or of different sex, meet there is an attempt on the part of the unconscious toward a transference. If the unconscious succeeds in making this transference acceptable to consciousness, either in purely sexual form or in some socially permitted, *i. e.*, sublimated, form, the feeling of sympathy arises between the two. If the fore-conscious denies the unconscious positive pleasure, various degrees of antipathy will arise varying with the strength of both factors.

Ferenczi therefore states it plainly; an individual's susceptibility to hypnotic or suggestive influence depends upon the possibility of transference, or more frankly stated, the positive, though unconscious, sexual attitude of the person to be hypnotized toward the hypnotist; the transference, however, like every object love, has its ultimate root in the repressed parent complex.

Practical experience in hypnosis adds testimony to this view. Certain characteristics favor the hypnosis, such as an imposing mien, striking features, self-assurance, ability to command respect. Sometimes the commands are given with sternness, or "surprise hypnosis" is induced by means which startle the patient. On the other hand, sleep is produced by means of a half-darkened room, absolute quiet, and so on, with gentle stroking of the hair, the brow, the hands. Some charlatans use chloral and bromides, to dope their patients, and thus attempt to bring about a transfer.

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These are two distinct methods at the disposal of hypnotism; the one rouses to involuntary obedience, the other induces to blind faith, the one uses fear, the other love. These two methods have been used by all professional hypnotists in the past, they have been used by parents for thousands of years.

For who is it but the father, who is represented by the imposing, terrifying manner of the hypnotist, the father whom every normal boy would believe in, obey and strive to emulate? The gentler method, on the other hand, reproduces those scenes of tenderness repeated numberless times at the bedside of the child, through the fondness of the mother.

Even such external aids as the ticking of a watch at the ear are such means as one would use to fasten a child's attention and do actually serve to recall infantile memories and emotions.

The requisite, then, for effectual suggestion, of hypnosis, is this, that the hypnotist must be "grown-up" in relation to the individual to be hypnotized, that is, able to awaken in him the same feeling of love or fear, the same conviction of his infallibility, with which he, as a child, regarded his parents.

Ferenczi insists here that this suggestibility is not a characteristic analogous to the psychical character of the child, but that the child in us still slumbers in the unconscious. Our childhood is constantly found in our dreams, and discovered in our infantile tendencies, performances, errors and in our wit. In our inmost soul we remain children throughout life. "Scratch the adult, and you will find the child."

Ferenczi is in the position to confirm his conclusions by reference to various patients whom he had first treated by hypnosis and later analyzed. The patient's own confession, but even more the further analysis, revealed the erotic character of the transference, which had given success to the hypnotic treatment, while the analysis went much further and plainly showed how the physician had taken the place of the parent, father or mother, in the parent complex, that in the ultimate analysis lay at the bottom of the disturbance, or had been at first a substitute for the later representative of the parent in the course of the patient's life.

There came to light in one case the compulsion of a "supplementary obedience," the compulsive heeding of the father's command given in childhood, which Ferenczi looks upon as an explanation of posthypnotic carrying out of commands. In both cases it is difficult to explain the actions carried out, for in the neurosis a

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long repressed command is obeyed, in hypnosis, one given in a conscious state for which there is subsequent amnesia.

It is only in the earliest years of childhood, when the child is purely auto-erotic, that the child feels the demands of his parents as an outward compulsion, and that they cause him a feeling of displeasure. As soon as he reaches the stage of object love, the child identifies himself with his parents, he introjects the objects of his love, appropriates them to his Ego. He usually identifies himself with the parent of the same sex, and fancies himself in the same situations as that parent. Obedience is then pleasurable within certain limits. If the demands of the parent extend beyond the bonds of love, the libido is prematurely turned from the parent and psychic disturbance is the result.

The author introduces a striking example of this in the story of Peter the Great and his son Alexei. Here the father's extreme austerity, impressed upon the boy through many external characteristics and mingled with a passionate tenderness but rarely exhibited, exerted an overpowering influence on all the later life of the crown prince, driving him even to his death.

This feeling of respect for the parents and inclination toward obedience is the source in later life of the same feeling toward teachers, superiors, rulers and all those in authority.

Two cases difficult of treatment because of the strong fixation upon the father, who in each case was teacher, too, confirm Freud's conviction that hypnotic credulity and susceptibility are rooted in the masochistic components of the sexual instinct. Masochism is pleasurable obedience, which a child learns through his parents.

The case of an anxiety-neurotic shows the analogy between the neurotic symptoms and so-called "term suggestion." A young officer had entered service under pressure from his father. He had resolved, however, to leave the service at the end of ten years, when he might be pensioned. At the expiration of this time he had forgotten his resolution and for various reasons he continued in the service. But it was at this time that the neurosis broke out. Not only did the analysis discover the relationship of this term of years to the outbreak of the sickness, but it carried it back to the childish relation to the mother, particularly to infantile phantasies concerning the term of menstruation and of pregnancy in the mother. This case confirms Jung's statement that "the magic, which binds the children to the parents, is the sexuality on both sides."

Psychoanalysis can explain what seems to many as an absurdity,

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namely that a large percentage of healthy people can be hypnotized and so a condition of "artificial hysteria" can be produced in them. For psychoanalysis has discovered that all struggle with the same complexes, and that there is in every one a bit of hysterical disposition, which favoring circumstances might develop into illness. The hypnotist can in fact produce no other phenomena than the neurosis produces spontaneously. In both, moreover, unconscious complexes determine the phenomena, and among these, the infantile and sexual, especially those related to the parents, play the greatest part.

We may readily assume an extensive relationship between the mechanism of autosuggestion and psychoneurotic symptoms, which are the realization of unconscious ideas. Yet this is no other than the relationship that exists between the neuroses and external suggestion, because according to the foregoing hypothesis, there is no such thing as hypnosis through the introduction of an idea from without. *What occurs is this, that the unconscious, preëxistent, autosuggestive mechanisms are set in motion.* The actual suggestion may be compared to the precipitating cause of the psychoneurosis.

The differences that may exist between hypnosis and neurosis form a problem for future investigation. It is sufficient to state here that the high percentage of individuals capable of hypnotism among normal people is an argument for the universal possibility of a psychoneurosis, rather than one against the similarity of hypnosis and neurosis.

It may seem paradoxical that the resistances against hypnotism and suggestion arise from the same complexes which are the source of the transference, hypnotism or suggestion. Yet Freud has discovered this and confirmed it in many cases. According to his conception the inability to be hypnotized is an unwillingness for the same. There are neurotics who do not want to be cured. They have come to terms with their symptoms in such a manner as to secure, without self-reproach, unconscious erotic pleasure or other advantage, though in a costly or impracticable way. The second sort of resistance is found in the patient's antipathy to the physician, the roots of which lie mostly in the unconscious infantile complexes, as has already been set forth.

Other resistances which are discovered in the course of psychoanalysis appear also with attempted hypnotism. There are feelings of sympathy that are unbearable. The cause of much failure in hypnosis has been given by Freud as the fear "of becoming too

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familiar with the person of the physician, to lose one's independence toward him or to become sexually dependent upon him." Yet both the inclination toward hypnotism on the part of one patient, and the flight from being influenced in another, have their roots in the parent complex, especially in the manner of withdrawal of the libido from the parents.

Another convincing example from the author's analytic work illustrates how a marked haughtiness, which prevented hypnosis and made a psychoanalysis difficult, was finally led back through the analysis to an experience in girlhood, when this haughtiness served as the only weapon against the father, and how this was in turn rooted in early infantile sources, highly colored sexually.

Ferenczi states his conclusion tersely by saying that the subject is unconsciously in love with the hypnotist and the tendency for this is brought along from the nursery. Any ordinary love affair manifests the same phenomenon. A lover will perform almost involuntarily any act suggested by his loved one, even, it may be, a criminal one.

According, then, to his conception, suggestion and hypnosis are the deliberate establishment of conditions under which a tendency to blind belief and uncritical obedience (a remnant of infantile erotic love and fear toward the parents) present in every one, but usually repressed by the censor, can be unconsciously transferred to the person who performs the hypnotism or offers the suggestion.

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CHAPTER VII

Overcoming the Conflicts. Socialization [Integration] of the Personality. The Use of the Dream in Handling the Dynamics of the Transference-Resistance

We are ready now to draw together some of the threads of the previous discussions. The goal of the analysis has been broadly outlined as an effort towards socialization of the personality. This is accomplished by the taking away of libido, *i. e.*, releasing it, from infantile fixations, and by stepping it up, if one might use an electrical phrase, to more advanced adaptations in the reality world. It is a form of teaching the patient to grow up. But, as has been seen, it differs from the usual types of pedagogics in that the dynamic factor, transference, is utilized to have the patient realize the old dictum of "Know thyself." This "thyself" is interpreted in the light that the real thyself is "unconscious" to the patient, and this is the cause for the persistence in maladaptations through the conflict. This conflict on the one hand (regressive) contains the sum total of century-old accumulated wishes to remain at a lower level of adaptations with their physical constitutional organic structural stabilizations, and on the other hand contains the progressive urge of the spirit of life (spiritual some people term it) to bring about newer, better and more vitally valuable adaptations. These adaptations are preëminently social and make for the stabilization of the best values in society. The ideal of the true, the beautiful and the good is reached through a biological process of pragmatic racial wisdom equally as well as by means of an absolutistic fiat of a God.

We have spread out before us the different parts of the machinery and have attempted to group them into large units or classes for the sake of ease in handling. The utilization of the evolutionary concept has been the most feasible concept in pursuing this general schematization.

As the geological history of the earth has been patiently investigated, so too must the mental history of man be pushed further and further back. It will not suffice, as has been shown, to take the conscious as the criterion for this history. The conscious is, in a manner of speaking, only a recent crust—only that which the cerebral

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mechanism permits to come out into the open to further the action now being performed. Behind it lie the vast accumulations of past biological experiences which have fashioned man as he is, and are contributing to his becoming.

In the language of geology, successive periods have their outcrops, their horizons. We speak of Paleozoic, Cenozoic, Mesozoic, and Psychozoic times, in each of which successive horizons are distinguished, from the primitive archaic rocks to the most recent times. The principles which have governed the terminology of these periods have varied, but each of the main divisions has been named after some striking feature. Thus Silurian, Devonian and Carboniferous, respectively, refer to reptiles, fishes and coal-plants. In certain places on the earth's crust almost the entire series of layers lie like a book opened to the observant eye. A "big hole" is all that some can see in the Grand Cañon of the Colorado. Almost the entire geological history of the North American continent lies there revealed to the geologist. The former yawns and wonders whether it is worth while to go to the bottom and see the muddy river. The latter thrills with excitement and could spend a lifetime in working on the evidence.

So it is with the cross sections of the human mind, of which one gets a glimpse in studying the unconscious. To the casual observer it is just a "big hole," but to the student of humanity it is an infinity of possibilities. It will be charted some day. As Adolf Meyer has well said, now that man has found the North Pole and the South Pole he may fit out an expedition to find out something about the human mind's possibilities.

Will it not be possible to express the advances in the mental integrations in some such manner as has the geologist? For the purposes of psychoanalysis I have suggested some such scheme for four chief periods. At the base lie all those trends with which the human being comes fully endowed into life; these are the inherited experiences of useful action, some as old as the beginning of life. To this level of the series the term Archaic may be applied. As yet no suggestions are offered as to a practical terminology of cultural horizons in this archaic period. In point of time it is the 100,000,000 year accumulation which has already been defined (p. 40). The next period, more recent, may best be termed Auto-erotic[1]—it is

[1] Dr. F. L. Wells has suggested autohedonic. Organerotic is a valuable term. It is the desire part which lies behind the "vital" action of an organic function.

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the period of individual organ integration. The terminology of its horizons will best be sought from comparative anatomy, comparative philology, comparative anthropology, etc. In a recent study I have tried to outline a horizon in this period which I have termed the Ovidian. It represents the repression, for the race, of the bestiality motive. Animals as libido objects became libido symbols.[2] For the third period the term Narcissistic has been utilized. Its highest horizon marks the integration of the individual as a social being. Anthropology must offer the terminology for subdivisions of this period. In this connection Osborn's "Men of the Old Stone Age" is illuminating. The Social period is the final period of this series and represents the past 10,000 years of man's socialization, during which an integration of the herd instinct has become more and more valuable. In history, art, literature, religion, etc., are to be found the terms for the symbolic periods.

In a broad general way the unconscious will show outcrops—thought fossils—of all of these periods. The patient slowly and patiently learns what sort of a man he really is and wants to be in terms of his innermost striving. The dreamer who dreams *I am alone on a desert island, Hawaii, Honolulu,* etc., already quoted (see p. 84), is only turning up a thought fossil from the unconscious which lies in a stratum antedating her period of socialization. It is a narcissistic horizon, this desire for individual freedom, this wild desire to be free from any control, to play the game alone and according to her primitive desires. All the dreams will show in greater or less degree of moulding these thought fossil symbolizations. To integrate the personality by means of this incontrovertible evidence is the synthetic side of psychoanalysis. Analysis and synthesis proceed side by side.

In such a synthesis it may be of service to very briefly summarize the steps already traversed in detail. It may be assumed that a tentative sizing up of the situation has shown that the patient is suffering from a disorder which may properly be handled by a psychoanalytic procedure. (See chapters, What Not to Analyze.) The main resources of internal medicine have been utilized to guard against the mistake of attempting to do away with a definite somatic disease by psychotherapy, a mistake which, in passing it may be remarked, occurs much less frequently than the reverse—that of trying to treat a preponderatingly psychical product by surgery or internal medicine.

[2] "The Rôle of Animals in the Unconscious," by Smith Ely Jelliffe and Louise Brink, *Psychoanalytic Review,* Vol. IV, No. 3, 1917.

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The patient has been encouraged to tell in detail the whole story in all of its social and personal ramifications. The significance of mental mechanisms in disease and particularly those in the unconscious has been told the patient and the method of using the dream as a road to the unconscious has been explained. The analysis then proceeds by the careful selection of those dream symbolisms which the transference features of the dream reveal as most acceptable to the patient's conscious point of view.

What Sidney Lanier, the poet, has called the "little leaven of dream-taught wisdom" is discussed by the analyst with the patient. In certain patients the advance is at first very rapid. Dream after dream will reveal in clear and unmistakable manner what practically lies in the foreconscious of the patient ready for reappraisement and readjustment. Self-revelations may then proceed with startling alacrity. In others on the other hand the progress is extremely slow. Particularly is this true with usually older individuals, and in those whose protective devices are well rationalized. In these the resistance features already outlined appear very early, and make a strong contrast with the other trend where positive transference signs are numerous.

One is comparatively soon in a position to attempt a graphic summary of the situation. This the analyst may do for himself or he may make it a matter of mutual study with his patient. In a manner analogous to a temperature chart he may attempt the infinitely more complicated procedure of putting on paper an appraisal of the psychical trends of the individual, a psychogram as it were. Fragmentary and incomplete as such a record must of necessity be, yet nevertheless it may help him to objectify his work and afford standards of comparison in the dynamic progress of the case. He may thus watch and possibly record the progress of the cure, and at the same time by analogy offer some light on the character of the disease mechanisms which are under consideration. Such graphic charts may help the patient, but at all events in an article on technique for beginners I feel they may be of help and therefore will phrase it somewhat as follows:

The ideal may be assumed to be what has been termed a well-rounded character, that is, that the individual who has full command of his libido in all situations in life is, psychically speaking, the best adapted. In these pages it has been expressed as "full socialization of the libido through the process of sublimation." Such a "character" may be represented by the accompanying circle

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in which the outer circle represents complete social adaptation. Within this circle another is represented, embodying the grade of evolution to the narcissistic phase. Herein the individual's libido is taken up completely with self. *His* books, *his* money, *his* ideas, *his* clubs, *his* opinions, *his* family, etc., etc. Within this another circle represents the stage of organ values, the organerotic phases of evolution, while the central core of the graphic is taken up with the evolutionary period of the archaic.

Thus from within outward one may construct an arbitrary scale of gradually advancing evolution towards complete socialization of the libido through archaic, organerotic, narcissistic to social goals. Furthermore, dividing the whole figure into sectors, one can in a way partly indicate this evolutionary scale in terms of the partial libido trends.

A hypothetically ideally perfect character then would be represented in the graphic by a perfect circle. Failure of complete socialization of the libido (adaptation to reality) might be represented by indentation of the curve to such a phase as the individual character failure (fixation or regression) might indicate in any particular instance of conduct. The indentation is to be recorded in the particular partial libido sector in which the regressive or fixed factor was most prominent. As the analysis proceeds it becomes possible with increasing exactness to make an outline of the character and thereby to determine, much in the manner of speaking of military strategy, where the weak salient is to be found, that is, to determine focal points in conflict (complexes) where energy is being diverted (fixations) to useless phantasy ends.

A partial plotting of a few cases will illustrate the mode of working of such a scheme. As it takes may be months to get all the information, the purely schematic nature of these charts will be evident, but they are used to show what psychoanalysis tries to do. Leaving out of consideration a number of other neurotic signs, the patient first illustrated shows two very clear ones which in the diagram are presented in the partial libido sectors of the *eye* and the *bladder*. Thus in the eye sector one observes a definite dipping down of the graphic corresponding to a fixation of the libido at the narcissistic level. This corresponds to a definite symptom. Whenever this patient for instance is riding in her automobile, and another car seems to be coming too near, suggestive of colliding, the response is a compulsory shutting of the eyes. This means that a thing cannot happen if she cannot "see" it. That is what *she*

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cannot "see." This is a typical narcissistic manifestation, which further results in her shutting her eyes to facts which she does not wish to see, and also her ears to things which she does not wish to hear. She does not regress here down to the organerotic level, as to make her eye organ actually blind or her ear organ deaf (psychic

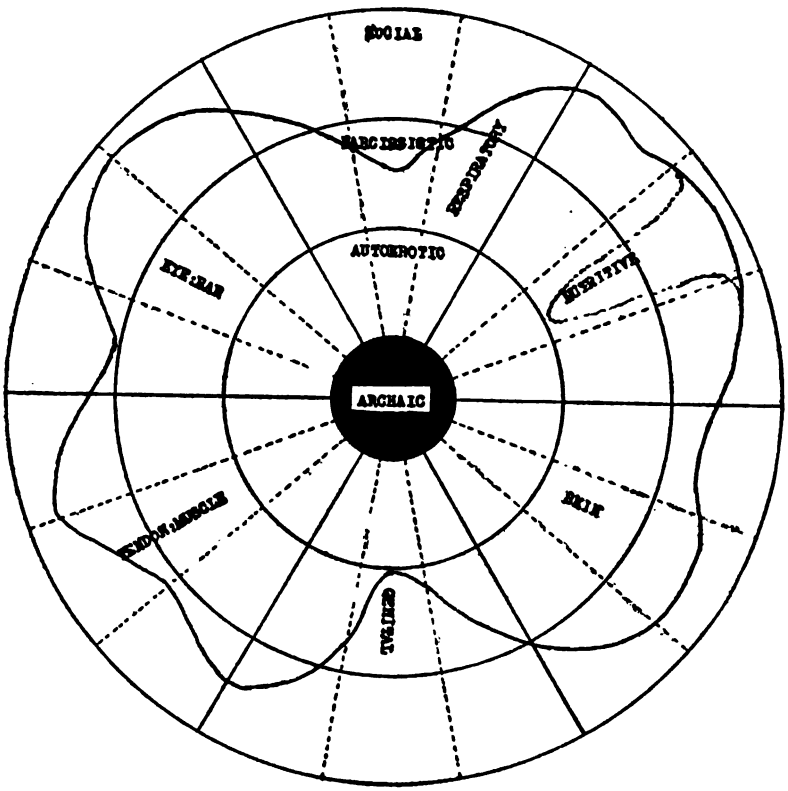

FIG. 1. Schematic representation of fixations of libido in one patient. The dip in the respiratory sector representing a psychogenic asthmatic defense reaction in an individual continually talking of self; in the eye and ear sector refusing to see or hear truth and reality; in the genital, urinary eroticism. The deep incision in a fairly well socialized nutritive libido represents an emotionally conditoned capacity for selective rumination of individual ingredients in the stomach. A severely sick individual on the border of a psychotic reaction. Present nosological schemes would call this anxiety-hysteria or a manic-depressive psychosis if the compensation should break.

blindness and psychic deafness), as this might cripple too much. Thus in the plotting of the symptom the curve only descends to the narcissistic level.

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In the bladder-rectum sector, however, one notes in the diagram a deeper sinking of the curve to the auto-erotic level. This corresponds with an extremely striking symptom which consists in a loss of control of her bladder. Thus the same patient, also in her car, is, let us say, held up by the congested traffic on the street. Being in a hurry, she becomes very impatient until finally she has an involuntary passage of urine. This mode of response has been going on for so many years that it has become her habit always to wear a cloth. Here the phantasy way of overcoming the difficulty is at a more elementary level. It goes back to the bladder power sense (organerotic Jehovah) which has been discussed in these articles (see p. 40). The patient, in phantasy unconscious auto-erotic fixation, triumphs over the necessity for self-control in being held up by the traffic, and asserts her mastery by the symbolic early and necessary mastery acquired over the control of the bladder.

One would by the law of ambivalence, which has also been discussed, expect to find this patient excessively keen-sighted to find faults in others, remarkably acute to hear the least verbal equivocation, and to be excessively neat and minutely clean with reference to her bodily secretions. Such is the inevitable law of psychical over-compensation and the contradiction in the conscious acts and the unconscious phantasies.

Now such a graphic shows the point of attack. The dreams show the great impatience of this patient—great rapidity with which everything is done—and also at times the urinary and eye symbols appear in the dream and permit the discussion, *i. e.*, the attempt at straightening out the salient, in the evolution of the psyche.

For instance this patient is too impatient to read. She can not stay quiet long enough. Naturally she will not remember what she reads. The task, therefore, of the analysis is to get at the tied-up phantasy satisfaction that these graphic dips indicate. To bring into consciousness the fact of this form of self-worship (narcissism) through rejection of the things seen and heard, which by the way in which they are handled by the patient prevent in her the growth of character. Such trends when continued too long result in disease of a minor or major nature, an idiosyncrasy, a psychoneurosis or a psychosis, or even a grave physical disorder, depending upon the number and depth of these fixations.

Thus in an otherwise healthy graphic one detects only a few of these dips into earlier levels of adjustment. For the purposes of illustration take Webster's habit of compulsory toying with a button

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on his coat while speaking (narcissistic tactile phantasy). One speaks of it as an idiosyncrasy. In the case just cited, however, where one has eye, ear, bladder, stomach and other fixations, one makes a diagnosis of hysteria—partly by reason of the number of the failures of the partial libido trends to socialize, partially be-

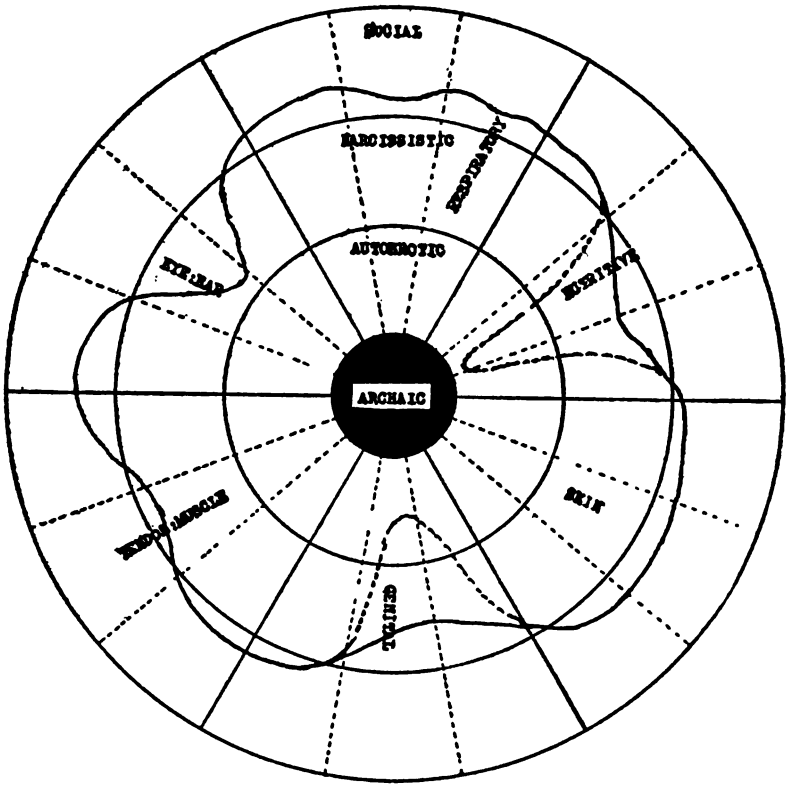

FIG. 2. Schematic psychogram of unconscious trends as shown in the dream wish. Markedly reduced interest (shut in character-introversion) and low dips into archaic forms of libido phantasy. Cannibalism(?) and food fertilization symbols apparent. Nosologically speaking, a dementia præcox seen from the dream level. Illustrating the value of the dream material for diagnostic purposes. This patient at the conscious level was thought of as "neurasthenic."

cause of the deep level of the regression. When the level of the regressions is low (archaic or organerotic), then one nosologically speaks of a manic-depressive or dementia præcox.

Thus for another patient I would make a schematic graphic, this

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time utilizing the dream material rather than the symptoms to show how the turning up of a deep level thought-fossil in the dream may throw light upon the probable diagnosis.

This patient, referred to me by her much older husband, a physician, was a young woman much interested in economic and social problems. She had been attending lectures and had complained to her husband of failure in her ability to concentrate. He said she had not been as well as usual and had been treated in her home town for a few months for neurasthenia. She had had a Weir Mitchell rest cure and was still somewhat indifferent and listless when he brought her to me. This was about all I learned, save in greater detail as to the treatments, what the different doctors had said, her home situation, etc. She was alone and of independent means, and I recommended a week's observation, as outlined in the early part of these articles. On the fourth or fifth interview she brought the following dreams:

1. *I am reading a newspaper. There seems to be some announcement in it and I find myself going downtown where a group of people are assembled, with which assemblage the announcement in the paper seems to have some connection. We are all looking into a two-story frame house, like a house on the stage with the side removed, and on the second floor there is a large woman, and she is apparently making soup for the crowd. I see the bones of a man's chest in the soup pot and am curious.*

2. *I am seated by the seashore on the sand naked and there are a lot of people walking about. I am quite at my ease. I notice that the ocean stands up like a wall about six feet high and projecting from it there is an ear of corn which I commence to eat with relish.*

There are too many things in the dream to attempt to plot them all on the scheme, but in the stomach partial libido sector—soup and ear of corn which is eaten—and in the eye libido sector—the seeing of the chest in the soup pot, and being naked on the sand—are to be found thought-fossil horizons worthy of comment. In both dreams *there are many people,* which is a more or less universal way of saying *large unconscious demand,* and hence in terms of ambivalence, *known to but few, i. e.,* in the Freudian terminology, *"a secret."* This large unconscious demand, the libido, can be checked off on the nutritive sector at a very primitive level, archaic, for both dreams.

In the former dream it deals with eating soup of human flesh, *i. e.,* cannibalism, one might say. This is a primitive wish which, while conscious, uncontrolled, and natural in a few of the most

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primitive of tribes, has little place in the present cultural horizon. In the second dream primitive customs are again seen. Whereas on the surface of the dream it deals with a fellatio phantasy, at a deeper symbolic level, it deals with the early childish, *she was naked and not ashamed* in the dream. Her libido is here occupied with a period in regressive phantasy before modesty and the sense of shame had arisen, and she was eating a sexual symbol. *Fertilization by means of food* stands out (see case of Zenia X.) indicating an archaic stage of the relations of sexuality to fertilization. No matter how socialized this patient's libido may have appeared on the surface, in the unconscious there were very marked animistic trends, archaic they are here represented, and the graphic would have to show a very deep gash into the very center of the circle. On the basis of this evidence chiefly a diagnosis of dementia præcox was made. The further progress of the case bore out the diagnosis and prognosis given at this time.

Just as the archaic preoccupation in the unconscious is recognized as a deep regression and can be so charted, so also dream symbols of *reduction of the libido* may have a sinister significance and call for special caution.

Thus in the analysis of a patient suffering from pathological blushing with other things, the following fragment of a dream was obtained: *First I am on an ocean liner, and then in a row boat with my father and mother and sister, on the inside of this liner. I manage to get out through a porthole, it is very stormy, and I am now on a raft with my sister tossing in the angry ocean. Finally I am on a desert island with my sister. There are two wild animals attacking her, rhinoceros, hippopotamus, and I kill one of them.*

The first feature here is the striking *reduction of the libido* symbols, large liner, row boat, raft, desert island. Then there is the death of the libido symbol, the killing of the rhinoceros, *i. e.*, a wild libido relative to the sister (incestuous phantasy). Further the archaic symbolism of being within the larger vessel may have some relation to an intrauterine skin phantasy—his blushing was all over his body. The evidence pointing toward suicide was overwhelming. At a critical period in the patient's life (marriage of the sister) regression was complete and he suicided.

At this point it becomes necessary to say a word about the symbolism of the dream. Much has been written on symbols. I refer to White's article in *Psychoanalytic Review,* Vol. III, No. 1.[3] The

[3] Mechanisms of Character Formation, a work which every beginner of psychoanalysis should read

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various works already quoted in these articles have much to say relative to symbolism. In touching on symbolism it should first be insisted upon that every symbol is a purely relative matter with each patient. I must remind the reader of the origins of language, and emphasize the fact that without a grounding in the principles of the evolution of language little headway will be made in the scientific comprehension of psychoanalysis.[4]

No one has stated the fundamental fact as well as Bergson when he says that the latent root of language in the infant is that "anything may mean anything." To use Pawlow's phrase, every word becomes a conditioned reflex, and in the language of psychoanalysis, the term "complex" is a certain definite series of these conditioned reflexes. Thus in Pawlow's experiments the dog is shown food, and saliva and gastric juice flow. Later a bell is rung and an association formed. Later a ringing bell without food will determine the flow of gastric juice. It could have been a whistle as well as a bell or anything else. So with the beginning of the conditioned reflex of Pawlow, "anything can mean anything." In one dog bell ringing equals food, in another, maybe, whistle blowing, etc. So associations are built up in different animals (people) through different experiences, *i. e.*, different symbols. Whereas anything may mean anything for the beginning child or the experimental dog, the whistle has no effect on the bell ringing dog and vice versa; hence the necessity for determining the exact symbol and its primitive "conditioned reflex" trend; its earliest associations and their affects. This is ascertained in the patient solely by analysis. They themselves slowly learn from their own recollections as they go further and further back what the relations are between the "food and the bell," or the "anything and the anything." Thus in the dream just narrated why should this patient use "rhinoceros and hippopotamus"? What did *they* mean *to him?*

The critic of psychoanalysis is constantly puzzled about dream symbolism. L. H. in a recent review of Maeder's Dream Problem[5] thus says that "anything can mean anything to the psychoanalyst," in which he misses the important point that this is true, but true in the sense just related, that "*everything* means *something*" and the *analysis* tells what it *does* mean to the individual patient. The analyst never knows until the patient establishes the development of

[4] See Jung's Psychology of the Unconscious; also Silberer, "Symbolbildung," l. c. Kleinpaul, Sprache ohne Worte.

[5] Journal of Abnormal Psychology, August, 1916.

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the symbolism. Increasing experience may aid him to see certain groupings and trends, just as a botanist can see the relationships of two plants, one an herb and the other a tree, which, in spite of apparently gross dissimilarities, are nevertheless intrinsically closely related.

Thus an anthropologist might *guess* that when a patient dreamed that *"she was having coitus with her husband while she was unwell,"* she was hoping that her husband might die. Because he knows that for many primitive tribes all over the earth's surface the touch, even the seeing of menstrual blood, is held to be very dangerous to man, to crops, to food, etc. For the analyst to a priori assume this interpretation would be foolish. But when in addition to the anthropological knowledge that this is a widespread primitive belief, and from the patient herself, in the analysis, he learns of her ideas about menstruation, which going back to infancy establish the identically same or closely related fact, he is then permitted to assume an archaic symbolism in the dream and to draw his conclusions from it.

So in the case of the rhinoceros and hippopotamus, when one finds from the patient's own associations the coarse jokes relative to "rhinos" and "sore ass" and "pot muss" and then also finds infantile urinary and fecal phantasies, and nursery monkey tricks relating to this very sister, then one can realize that the "reproach" of the unconscious which lay back of his blushing contained certain non-sublimated affect values which by reason of their constant attempts at expression caused his neurosis and his suicide.

When for the psychoanalyst the wild animal is a *generic type* for wild and reprehensible libido, it must be remembered that this can only be utilized when backed by the patient's own associations. To prove this for every case reported would be too tedious for the most enthusiastic readers and a complete analysis would occupy many volumes. Frazer has written twelve volumes on the symbolism of the one symbol, the mistletoe. A complete analysis would fill a library. Therefore in reporting a case the analyst can hit the high spots only. This subjects every reported fragmentary analysis to criticism. To all so inclined the footnote on the first page of Leibnitz's famous work on philosophy, Monadology, might be quoted. "It is characteristic of me to hold opposition as of little account, exposition as of much account, and when a new book comes into my hands I look for what I can learn from it, not for what I can criticize in it."

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Symbolism is at the same time the most difficult and most fascinating part of analysis and tests the therapeutic possibilities of the analyst more than any other feature, for with the advancing subtlety of the unconscious to guard itself, *i. e.*, to hang on to earlier phantasy formations, the symbolism becomes very intricate, and unless the patient will give free associations the meanings will be most ingeniously concealed. One must therefore stick to the free associations and never leave them to arbitrarily thrust in one's own interpretations. These latter are the analyst's associations, *his* conditioned reflexes, *his* "food-bell" associations, not the patient's.

Whereas the individuality of the symbols must be insisted upon as a cardinal principle, yet there is enough evidence to show that certain groups of related symbols are very widely used and determine group reactions. Just as one may recognize Chinese, English, German, French and Italian as certain symbol groups employed by great units of people in which the similarities of English and German have a common Teutonic root, of French and Italian a common Latin root, and all four a common Sanskrit root, whereas Chinese is evidently very distinct from all, so one will find the unconscious of many people using root symbols, as it were, meaning by them identically the same thing. This is only in line with the whole evidence bearing on the great principle of evolution, which receives much interesting confirmation, even explanation, from the unconscious handling of symbols.

Thus in the opening pages of this volume I spoke of the patient who could not say negro but substituted "booey" man; who could not hear the word "snake" without being frightfully agitated, but could use the word "serpent"; who put white papers on the closet floor saying, "all must be light," but could not look at a pipe, a cane or an umbrella nor step over a hose. Here by the aggregation of symbols it becomes evident, to the psychoanalyst at least, that the sexuality of the dark fearful (negro) thing in her life which must be made light (white paper in the closet), the snake, cane, hose, umbrella, pipe, all are "conditioned reflexes" to the thing "penis."

This patient would have to be analyzed as any other and no amount of *telling her what the symbols meant* would cure her. That knowledge must come from the inside, otherwise why all the unconscious defence which so effectually "reveals what she would conceal"? Thus the analyst comes to a knowledge of the symbol values at the same time as the patient and only by patiently asking: What comes to your mind? what then? what does that suggest? what do

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you think in reference to your first impressions relative to this, etc., etc., that is, by the method of free associations. Then the patient himself learns why he does not like clams, or cannot eat scallops, and why he is always late or always misspells, or forgets names or gets disturbed under such and such conditions. As has been said every little action in life has determining causes. It may be inexpedient or useless to analyze them, especially for those whose libido is sufficiently free to constitute what is pragmatically assumed as "normal," but for the neurotic, many of whom may be valuable people for the community, attempt should be made to find out why things mean what they do and how have they come to be.

In the course of an analysis a large number of small mistakes in pronunciation, in word misplacements, apparently trivial forgettings, mistakes of action, etc., will come up. These are very important clues to unconscious complexes. Freud's work on the "Psychopathology of Every Day Life" should be consulted relative to these.

This work cannot concern itself with the details of symbolism. I have spoken of the individuality of symbols, but a word may also be said about generalized symbols—standard symbols, which are more or less universal. Such may be found in the work of Freud on the "Interpretation of Dreams," and in Stekel's large works on "Die Träume" and "Die Träume des Dichters." I shall mention here only some of those of more general interest, particularly those which frequently appear and which have a special interest as symbolizing the male and female sex, and the object and aim of the reproductive instinct.

Thus the patient's own body is most frequently spoken of as a house. Nakedness of the body is frequently indicated by clothing, uniforms, draperies, hangings, nets, etc. Parts that show through are peeping and exhibitionism symbolisms. The male body is symbolized by flat things, the female body by irregular ones, mounds, hills, rolling landscapes, etc. Climbing on flat surfaces, or balconies, indicate these differences.

The sexual act is largely symbolized by those types of movement which contain alternations of parts of the body or rapid backward and forward movements. Thus running, up or down stairs, dancing, swinging the arms, artificial respiration movements, playing the piano, swinging in a swing, or hobbyhorse, or ticking of a clock, metronome striking, etc. Much will depend upon the relations of the parts in the dream whether this symbolism is a true coitus wish or only a

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masturbatory wish. Thus five-finger exercises on the piano is frequently a purely masturbatory wish. Not infrequently the coitus is represented as a masturbatory type of coitus. For it should be remembered that much coitus has a masturbatory character. Thus a coitus as expressed as going up a pair of stairs usually has a more ethical significance than one going down a flight of steps. The figure 3 is frequently used as a coitus symbol. It is used for other purposes as well. Thus one patient—a mild schizophrenic—states consciously she goes up three steps and stops, then three steps and stops, for if she does not she will not have a movement of the bowels. She is stating in a symbolic way—" with coitus she can have a baby " —the movement of the bowels referring to an infantile fecal birth phantasy.

The male organ is frequently symbolized as something long and thin—a dagger, umbrella, stick, cane, tree trunk, pillar, barrel, revolver, arrow, asparagus, banana, pear, corn cob, reptiles, fish, snakes, etc., etc., rain pipes, leaders, sprinkling pots, coffee pots, etc., often symbolize the male organ; the female genitals as muff, bag, box, chest, purse, pocket, chair, bed, hole, cave, church, crack, center of a target, windows, doors, small rooms, cellar. The figure two is a frequent female symbolization. Hairy animals may be either organ as determined by the size and character. Fear of touching a dead bird in one patient was a definite masturbatory symbol. Playing with kittens another. Castration and masturbatory phantasies (fellatio and cunnilingus) are frequently associated with losing a tooth.

Potency and impotency symbols are frequently represented by flying machines, Zeppelins, balloons, trees standing or falling, pillars standing or falling (Sampson). Flying is a frequent erection wish. Losing trains, or boats or busses or things—these are frequent impotency symbols.

Birth symbolisms center about water; going in or coming out; saving people, animals, objects from the water.

Death wishes are represented by reduction of the libido, going into the dark, going away, on journeys, on the railroad, boats, etc.

These are but a few of the more standard symbolizations, more precise details concerning which must be sought for in the works mentioned.

Kaplan in a recent valuable work on the Fundamentals of Psychoanalysis[6] has some very practical suggestions relative to the subject

[6] Grundzuge der Psychoanalyse, Vienna, 1914.

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of dream symbolism, some of which I here utilize, in free translation, as they are apropos at this point.

He reëmphasizes that the language of the unconscious is a symbolic or picture language. Much conscious language is also purely pictographic. It is important then in the dream to attempt to piece together this conscious and unconscious use of the symbol through the common and distinctive features of both.

"Thus the hand hollowed like a ladle is a gesture for a drinking vessel and is based upon immediate association, but the Indians make the same gesture to express 'water.'" "Thus the plastic image of the horned bull's head may for the Neapolitans express besides its immediate meaning of strength, as the main peculiarity of the bull, first, danger, particularly that of being assailed by an angry bull, next danger in general, and finally by a third displacement, the 'wish to be protected from danger.'"[7] The symbols of the conscious life are quite as ambiguous as those of dreams and myths. "In sign language of the deaf mute it is not said: 'He died because he was addicted to drink' but 'drink, drink, die.' The signs for drinking are several times made, then as sign for death the head with closed eyes is laid on the right hand and a gesture made toward the ground indicating 'sleep down there.'"[8] That means that *Every separate symbol has a certain indefiniteness, and only from the interrelation of the symbols can their sense be perceived.* Another common quality of the conscious (purposive) and the unconscious (purposeless) symbolism is that they both express only the *present;* extent of time has to be inferred. That accords well with the evidently sensational nature of the symbol; everything sensational belongs to the present.

Those who cannot avail themselves of sound language resort to sign language; deaf mutes and strangers who are unacquainted with the language of a country; likewise children are forced to seek the help of gestures in order to be understood. The gesture is in one sense the language of the mentally weak. But that is true of every form of symbolism. "(The pictures) are the more desired and more eagerly sought the more a concept is removed from sense perception and the more a suitable image fails to represent it.

"When for example a speculative savant thinks of the world, or more correctly the undeveloped universe containing in itself the germs of all things, as an egg . . . if the Roman emperor holds a

[7] W. Wundt, Volkerpsych., Vol. I, Part I, pp. 171, 172.
[8] Ib., p. 195.

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ball in his hand as the sign of world power, the globe in miniature . . . or if one of the church fathers wishes to grasp the divine Trinity in the schema of a visible triangle or a sounding harp, when he knows no better representation for eternity and the continuous recurrence of human things than a snake with its tail in its mouth, then the metaphysical concepts God, world, globe, eternity, Trinity, etc., force the imagining spirit to this conception and flit before him, nebulously trouble and pain him like mere outlines, until he masters them by means of a clear picture."[9]

Even an abstract science like mathematics, Kaplan significantly points out, had to go through a sensational-symbolic phase. The concepts of differential and integral calculus, which modern mathematicians have learned to grasp as abstract relations, and most of the analytical statements were at first fixed with the help of surfaces bounded by curved lines and with operations with such geometric figures. Strict mathematicians now regard it as an outrage in pure analysis to get any help from concrete geometry. If the origins of symbols in the line of evolution are studied, they are seen to originate when man intellectually grasps at something that his power of comprehension finds too remote. Conversely the symbol may also originate if his former higher power of comprehension is reduced (for example in dreams and in mental disorders). In both cases he gradually slips away while trying to catch the idea lying at the bottom of the symbol and falls into a lower form than is striven for by evolution.[10]

The symbols employed by consciousness, as they have an explanatory function, must be of a material character. They must readily bring to consciousness the relation with the thing that they are supposed to indicate. For example, Kleinpaul tells the following: "In German village inns I recall the laconic notice, 'No pumping (credit) here' but instead of the word pumping a picture of a man pumping water." What the pumping meant was clear to every one. Quite as clear are the so-called legal symbols. Thus in olden times "the setting of the foot on land or other property was a sign of legal possession"[11] or "the old Norse scotation consisted in a little earth from the purchased or pledged land being shaken or thrown into the fold of the coat or cloak of the new owner; that assured him

[9] Rud. Kleinpaul, Sprache ohne Worte, pp. 24, 25.

[10] Herb. Silberer, Ueber die Symbolbildung, Jahrbuch, III, 675. Silberer's work, which is very valuable in this connection, should be consulted.

[11] G. Sartori, Der Schuh im Volksglauben, Zeitschr. d. Ver. f. Volks., Vol. 4, p. 173.

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possession."[12] (Representation by sample.) It is a concrete representation of the transfer of the right of possession, which may be quite comprehensible to every one.

Picture language is the clearest of all, provided it is understood. Yes, provided it *is* understood! And who can say that he has rightly understood? . . . Whoever speaks in pictures (figures) always has the advantage, that he appeals to the understanding of others and may eventually change this understanding into doubt. An advantage often used![13] This advantage is taken by the unconscious which employs the symbols not to make clear, but on the contrary to substitute. Closely connected with this is the fact that most (explanatory) symbols of the conscious life have still a hidden sexual meaning. (They are therefore overdetermined.) Setting the foot on the land is a sign of taking possession, this legal gesture having, however, a less innocent sense. For "We take it as a sign of possession if the lover secretly steps on the foot of his adored, or the bridegroom on the bride's."[14] The significance of the earth as mother earth, as symbol of woman, is widely recognized. Here apparently is another case where the original sexual sense (the possession of the woman) is translated into the harmless (as a legal symbol). In any case it should not be forgotten that the concrete sexual relation has always existed, but on the contrary the legal relation of private property in land arose comparatively late in the history of man.

"If it is said that in order to forget anything as soon as thought of, one should throw his slipper back over his head, that is quite likely a symbolization of doing away with the power of remembering.[15] Here the symbolizing action is of a purely materially descriptive nature. But it is surprising that a slipper should be thrown; why just this object? The answer is easy, if it is considered that if one wishes to be free from an unhappy love one scrapes the dust from the heel of the right shoe, puts it in the shoe and throws it from a water-way backwards over the head into the water and goes home without looking around."[16] Every charm for forgetting was probably originally a means of avoiding unhappy love; the action symbolized the departure of the sexual object. That the slipper symbolizes the female genitals is fairly universally

[12] J. Grimm, Deutsche Rechtsalterthumer, 4th ed., Leipzig, 1899, p. 161.
[13] Rud. Kleinpaul, Sprache ohne Worte, p. 307.
[14] G. Sartori, l. c., p. 153.
[15] Ib., p. 153.
[16] Wutke, Deutscher Volksabergl., p. 555. Cited by Sartori, ib., p. 760.

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recognized. Thus in Fr. Müller's Faust: "He would be pleased[17] to be the slipper mender (paramour) of the Queen of Arragon." Also the expression, a slipper hero, under the slipper, etc.[18]

Many expressions are intelligible only when they are exposed as symbols of the unconscious. So, for example, in Ruppin it is said to one who has forgotten something: "You have surely stubbed your big toe."[19] Stubbing the big toe is frequently the same as masturbating. In every expression a deep psychological sense lies hidden. Whoever has formerly practised many auto-erotic gratifications, infantile masturbatory types, *not necessarily genital,* and then has repressed this fact from consciousness, becomes forgetful, because the wish to forget becomes generalized and is displaced also upon indifferent matters. Here is a source of much forgetfulness among children and adolescents and bad school work. Pfister's work already referred to is rich in the analysis of this type of material.

Kaplan further calls attention to Semi Meyer's criticisms of the psychoanalytic method, which are quite in line with those of L. H. already cited. "Everywhere an associative substitute is at the earliest possible moment dragged in by the hair. Why does that happen in dreams? Nothing of the kind occurs in waking life."[20] To that it may be replied that the critics are not acquainted with everyday life, as it is revealed in morals and customs, in law and in religion, otherwise they would not make such statements. In Frankfurt if "in pledging a piece of land a bag of earth is brought before the court and laid on the deed,"[21] the bag of earth is probably to be regarded as a representative of the pledged piece of land. Still more remarkable is the "Clagefurt custom of hanging the thief first and investigating afterward."[22] Crime must be expiated; that is clear to the primitive man, and so they hang the first man that comes along, in order to satisfy their desire to make some expiation. The hanged man appears to be the substitute (symbol) for the actual thief, who has probably succeeded in escaping justice. Such things are worked out in old historical times, to be sure, not in dreams of course but

[17] Grimm, Deutsches Wörterbuch, VII, Sartori, ib., p. 158.

[18] In a "Jugend" poet I found the sentiment, "New shoes and new lovers are uncomfortable." See also slipper symbolism in Hazelton and Benrimo's "Yellow Jacket." Analysis of this by Jelliffe, *New York Medical Journal,* 1907, and Kempf, *Psychoanalytic Review,* October, 1917, Vol. IV, No. 4.

[19] Maxims and Expressions from the County of Ruppin. Collected by K. E. Haase, Zeitschr. d. Ver. f. Volksk., Vol. 2, p. 439.

[20] Semi Meyer, Zum Traumproblem, Zeitschr. f. Psychol., Vol. 53, p. 223.

[21] J. Grimm, Deutsche Rechtsaltertümer, p. 159.

[22] Ib., p. 531.

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in actual life. The Westphalian expression, "The crow has brought me a nut" means "I have got a husband."[23] It is clear that even in waking life, if not so frequently as in dreams, "an associative substitute is at the earliest possible moment dragged in by the hair."

Herbert Silberer has shown that the sensational-symbolic representation of thoughts can be to a certain extent artificially produced. If in a fatigued condition, especially before going to sleep, one forces himself to follow the thread of a (theoretical) thought the abstract relations will take on a concrete form and will cause an hallucination.[24] A trial of the experiment leads one to suppose that the phenomenon depends on an individual factor, as not everyone will succeed in evoking the hallucinatory symbols in himself. Still the prime significance of the experiences as related is not affected. Not every one can be a poet or an artist, and yet the investigation of the psychology of artistic creation has universal human value. Silberer's method experimentally confirms the fact that in certain circumstances the psyche grasps at sensational-symbolic representation. One of my own patients has utilized this method for several months and has obtained remarkable insight into the unconscious and much freedom from severe compulsions.

In further illustration Kaplan speaks of two symbolic hallucinations (hypnagogic visions) which he was able to evoke in himself. Just before going to sleep he forced himself to think about the tragic heroes and criminals. There then arose the *First Vision.* A half lighted room. A man and woman. It appears the man has surprised the woman. But he is hit by the woman.

The theoretical thought which here struggles for expression is as follows: "The tragic hero signifies the criminal in us. Because he has overstepped the ethical norm suggested by society, he must finally fall, like the criminal who must expiate his deeds in punishment." In the vision one sees actually the criminal whom his deeds do not profit but who gets his punishment (the tragic situation). But as, according to psychoanalytic views, the sexual symbolism plays a dominating part in the unconscious, there appears in the vision not only the criminal but the sexual criminal.

Another time before going to sleep Kaplan thought of the connection between the Flying Dutchman and the incest feeling. There

[23] Weinhold, Ueber die Bedeutung des Haselstrauchs, Zeitschr. d. Ver. f. Volksk., Vol. II, p. 11.

[24] H. Silberer, Bericht über eine Methode, gewisse symbolische Halluzinationserscheinungen hervorzurufen und zu beobachten, Freud-Bleuler's Jahrbuch, Vol. I.

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arises the *Second Vision*. Infinite stellar space. The Flying Dutchman cloaked in a dark robe soars in this space. The scene gradually changes. He sees before him Raphael's Madonna brilliantly lighted. The change took place in the condensation of the stellar space into the canvas of the picture.

The vision has given a sensational form to the theoretic thoughts: "Because he rested too much on the mother (Raphael's picture)—he must be very unrestful when grown up (the soaring of the Dutchman)."[25] That the confirmation comes only after that which is to be confirmed is quite congruent with not logical but psychological succession; one thinks first of a thing and then one tries to comprehend it from the conditions of its existence and origin.[26]

The hallucinations, Silberer notes, are usually connected with the unconscious. In order to turn a theoretical thought into a hallucination it is necessary to have, besides the individual factors, two things: a very sleepy state and an intense activity of thought. "A connection between the hallucination and the waking thought . . . results only if the latter is full of energy. If one sets about aiming at a transmutation of the waking thought into a symbol one must supply the latter with attention by force of will. If this is not done, the complexes already loaded with affect will get possession of the person going to sleep and, without regard to the waking thoughts, will themselves seek to attain symbolic representation."[27] If it is noticed that a very sleepy state, or one related to it, does not appear well adapted to maintain theoretical thoughts by means of attention, it becomes clear why the scientist does not solve his problems in the hallucinatory way, why he is not a *visionary* but a *thinker*. The visionary is the unrestricted thinker, who for that reason follows the regressive path to its conclusion in the hallucination.

If strong affective states predominate in the mind of the individual, they make the "pushing forward" of the idea difficult, as they "deprive the function of attention of a part of its energy in claiming it for the autonomous complexes. The affects are not satisfied by disturbing the apperceptive function. Besides the nega-

[25] The foundation of this thought will be seen in Max Graf. Rich. Wagner in the "Flying Dutchman," Schrift. z. angewand. Seelenk., edited by Freud, 1911, Vol. 9.

[26] The interpretation of dreams is based regularly on the fact that many dreams must be read backwards in order to be understood. Freud.

[27] Silberer, Ueber das Symbolbildung, Freud-Bleuler's Jahrbuch., Vol. 3, p. 718.

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tive result they perform also a positive work in that by virtue of the attention energy turned to them they seek to give currency to the complexes to which they belong."[28] This state of affairs is found in the case of the power of the myth-making phantasy, dream, fable, religion and the visions of psychoneurotics.

The second vision, Kaplan states, is not only the materialization of a definite idea, it has also a concealed background. It has already seemed remarkable that one should meet the Dutchman in the rôle of a phantastic aviator instead of on the open sea. The infinite stellar space was however the scene of a countless number of stereotyped flying dreams, which the author dreamed as a child. The Flying Dutchman is therefore the writer himself. And during the last five or six years he has been forced to wander from one place to another without ever settling anywhere. His longing for home is, however, very great. The Flying Dutchman therefore turns into a little child that rests on the arm of its mother and may therefore feel safe from all troubles. A complex is associated with the theoretical thought and finds its expression in the hypnagogic vision. This analysis, Kaplan shows, provides one at the same time with a very valuable insight: *The adult yearns retrogressively from the struggles and privations of life toward the safe haven of childhood.* On this is based the chief factor of the power of the infantile in the mental life of the adult. This constantly recurring infantile form of representation must constantly be kept in mind.

I had thought to go into Stekel's very illuminating chapter on dream interpretation, but this has already been provided for in the January, 1917, number of the PSYCHOANALYTIC REVIEW. The beginning analyst should read this carefully as it clearly brings out how the various parts of the dream, when analyzed, lead to the unconscious of the dreamer.

Before closing this chapter I would again emphasize how important Freud's "Interpretation of Dreams" is for the analyst. For the very beginner it is a very difficult text, but as soon as one has commenced earnestly to pick out the dream meanings by the method of free association, this work can be read and reread to advantage. I have read it several times and with additional experience each rereading shows new matter and helps to explain what has been heretofore quite dark. There are still parts of it quite inexplicable to me although several thousand dreams have been torn apart and subjected to analytic research. Even the expert

[28] Ib., p. 685.

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urine analyst has much to learn of this comparatively simple product of the kidney activity; how much the more in need of extended research then is the enigma of the activity of the mental machine during the sleep period.

One way of looking at dreams has enabled me to understand them much better and also permitted a graphic representation, which I here hazard, as possibly affording some help to others.

It is fairly well recognized that all final expressions of the human activity, conduct or behavior—as they are variously termed—arise from the depths of feeling. From the unconscious this "wish" or desire part of us gradually rises into consciousness to further the "work in hand," through appropriate, that is, "censored" activity. "The cerebral mechanism is arranged just so as to *push back* into the unconscious almost the whole of our past." This is Bergson's way of expressing what Freud calls the "censor" "and allows *beyond the threshold* only that which will further the action in hand." This latter we call conduct or behavior—the filtrate through the censor. "Our past then is made manifest to us in the form of impulse, it is felt in the form of feeling, whereas only a small part is *known* in the form of *idea*."

This struggle upward I have tried to picture by an inverted cone. At the bottom is the core of generalized and highly condensed feeling and impulse, the rich background of the unconscious and archaic inheritance of all past experiences and values. From this well of feeling there comes surging to the surface some group of wishes, which, rising, separate out into the most primitive symbolic expressions of the same. As these symbols rise towards the surface they undergo various branchings, resymbolizations—the mechanisms of condensation, displacement and distortion that Freud so well describes. Finally they arrive at a point where the censor, or psychic diaphragm, cuts them off, they are now presentable to the censor. Then through secondary elaboration the manifest content of the dream appears in consciousness and is the material upon which the analyst works.

The method of free association now endeavors to lead backwards along the pathways that the feeling ascended from its sensational core to its resymbolized concrete intellectual image.

Manifestly there are many, many trends in this upward surge and no graphic can encompass the complex splittings, but I shall take a comparatively simple dream and endeavor to fit it into this graphic form of representation and illustrate a few of the points which have been discussed at length.

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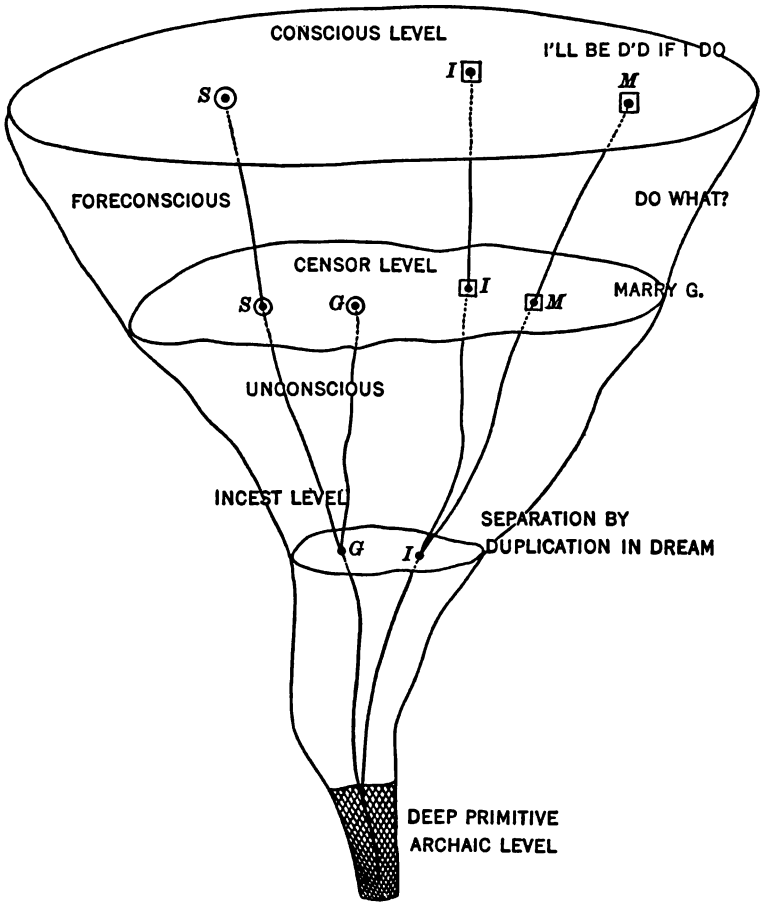
Thus the patient dreams: *G. (sister) and I are settled down. M (brother) and S (his wife) come around to the house to see us. S has a check to settle a little debt. G. is no longer there. M says "I'll be damned if we do."* I awake, and there is some sort of an idea of decision to live in a certain sort of a way. There is a sort



Rough and schematic illustration of the gradual transformation of the primitive archaic reproductive instincts wish as it passes to conscious expression in the dream as indicated in text. The chief points illustrated are the distortion by duplication. Dreamer I and M are brothers. G, a sister. S, wife of M, and the marriage wish of the dream. G and I are settled down. M and S come to visit us.

of an implication in the dream toward conservation of resources or fight for a living. The dream is extremely simple in form. The multiplicity of arising associations cannot be given, for discretionary

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reasons. Furthermore the dream is to be used only to illustrate in part the scheme which has just been spoken of.

Before reducing certain features of it to graphic form attention should first be called to two of Freud's statements in his "Interpretation," which book, as has been said, should have been thoroughly read by the analyst, or else these articles on technique will be of little service. He says one looks first of all for the *feeling* in the dream. If there is any distinct sense of feeling tone it must be used as the main pathway of approach to the dream. Then again, if spoken words occur in the dream they may be taken more or less in a literal sense. That is they are less distorted products of the dream work, most conscious.

The feeling tone of this dream does not tell much of anything save as to a conflict of the dreamer, whether by saving his money he can conserve his resources and continue not doing any work, which latter is so difficult, if not impossible, for him, or to get out and hustle and be obliged to work.

But there is the heard speech, "I'll be damned if we do." Do what? I shall start my cone then with this statement and speak of this stratum of the dream as the conscious stratum. In this stratum there are three characters only. M, the brother, S, the sister-in-law, and the dreamer. One has been eliminated, G, the sister. This is represented in the graphic by the small circles as marked. The position as to the next stratum of the dream appears also in the manifest content, G and I are settled down, S and M come to see us.

Why has the sister been eliminated at the conscious level? If one trend of the dream be expressed in this graphic way it is not impossible to see that the dreamer has finally forced himself to the conviction that his unconscious incestuous bond to the sister is one of the important links in the construction of his neurosis. The *conscious* attitude to the sister, it need hardly be said, is one of "intense antagonism." Nor is it to be wondered at that the sister also has a severe neurosis. The dream also shows that the way in which he handles his money, or rather the way in which he permits his brother to handle it, is his conscious, behavioristic manner of hanging on to the unconscious incestuous phantasy through its displacement to the anal erotic hate complex.

For the first time, following this dream, the patient, using Silberer's hallucinatory method, was able to finally reproduce the early infantile erotic sensations in relation to the sister. This relationship he had most persistently resisted as a possibility.

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This illustration is almost too simplistic to present, but if the analyst will try to picture to himself, in terms of the different strata of the dream thoughts, the condensations, distortions, splittings, displacements, etc., of the dream work, he will be able graphically to work out the chief stages in the unconscious erotic wishes of the patient and thus aid his patient to see them for himself. One can combine this form of graphic with those which immediately precede and obtain a fragmentary glimpse at the restless movements of the unconscious libido trends in their rapid differentiations and integrations. These finally result in action, showing themselves either as the metabolism of the body cell groups, or as conduct.

Before finishing this discussion I would call attention to a further bit of the work of the unconscious, glimpses of which may be read in the dream and which throws a searchlight into the possibilities of the future of the race. It has been held up as a reproach to psychoanalysis that it looks backward only. This is not in the least true. True it is like the weaver who must stop his machine to pick up a dropped stitch in order to go forward. The psychoanalytic method is a method for finding these dropped stitches—fixations—which prevent the use of part of the individual's energy for sublimation purposes. It goes back into the machinery to repair this difficulty in order that the individual may live a fuller and more complete life.

Practically all of man's activities come out of his unconscious. They push forward to keep the race in that path which will lead to further evolution. If 100,000,000 years have seen the ascent from colloidal ooze to man, what will the next same time span reveal and what agencies are at work to keep the individual and the race in the "strait and narrow path that leadeth unto righteousness," that is, race immortality?

In order to obtain a closer practical view of just what is meant, I cannot do better than to refer to Maeder's[29] stimulating work on the progressive aspect, the so-called prospective function, of the dream in the individual conflict. For it is the individual who embodies the epitome of the race and the individual activities which constitute racial development and progress. Moreover it is the dream which reveals most completely this individual in his controlling tendencies, if we consider it as revealing the two aspects, that which draws him back within himself and retards progress and likewise those tendencies which belong to his intrinsic and immortal spirit of progress.

[29] Maeder, The Dream Problem, Monograph Series, No. 22.

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Maeder's emphasis, therefore, upon this side of the dream and its therapeutic value is merely a furthering of the complete psychoanalytic work. It is the goal toward which all of Freud's work tends, toward which his whole effort is directed. Yet it was necessary in the beginning to lay repeated stress upon the necessity for "the most exhaustive occupation with (the complexes)"[80] and thus Maeder thinks the revelation in the dream of the progress of the patient in regard to his conflict and his life task has lacked emphasis.

It must not be forgotten that the illness is due to a conflict between these opposing tendencies, so that the dreams, arising out of this same unconscious, which is the source of activity and conduct, would be expected to present both sides of the struggle. As Maeder points out, the reaction formula is already in the child. On one side are his egoistic wishes controlled by the pleasure-pain principle, through which he seeks to have them fulfilled. Offset against these is the life plan to which his inherent progressive tendency, his immortality, compels him. The whole aim of the analytic investigation of the dream, as Freud has expounded it, is to liberate this progressive tendency, the libido, from its fixations on the opposite side.

Maeder's point is this, that the dream itself in its manifest content as well as in its appropriation of clinical setting in the course of treatment, makes use of what, according to Freud's terminology, may be called intrapsychic perceptions and images of the situation as it exists in the unconscious, or what Silberer terms autosymbolism. By this means the dream manifests the stages of development of the neurotic conflict or in general of the personality itself. It shows, as Maeder's illustrative dreams make clear, the patient's insight into his problem, his conflict and the progress he has made toward acceptance of the life task. It presents therefore both the resistance and retardation which arise and the resolving of these, which is largely accomplished through the analysis of them as they thus appear in the manifest content.

Maeder has made use of three happily chosen forms of illustration. The first consists of a number of dreams occurring at successive periods of the analysis, with also a few dreams chosen from other patients. In the second place he borrows from Freud's "Interpretation of Dreams" the recurrent dream of the poet Rosegger and submits these to the same test for the prospective and healing

[80] Freud, History of the Psychoanalytic Movement, Monograph Series, No. 25.

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function, extending thus beyond Freud's original analysis into the teleological service the dream rendered to the poet's actual attitude toward life. Finally he has utilized a second dream reported and analyzed by Freud, that of a nurse, in which the dream reveals the unwillingness of the individual to solve her problem and bring herself into an adjustment with life's demands.

Perhaps one of the clinical dreams will be best for incorporation into our discussion. I must content myself with an abbreviated reproduction of these dreams and their analyses and their place in the treatment as Maeder has reported them. "The dreamer is a youth of 18; he comes of a good family, of old stock which possesses, however, numerous neurotic features. He grew up between a father who was severe and violent in his demands, but who taken altogether, was quite lovable, and a mother who is gentle, yielding, sensitive and cultured. . . . He succeeded in being his own master, by allowing his own desires and moods and interests to dominate his life. Gradually tremendous gaps were noticed in his development. There followed a chasing from one school to another. After some years the youth emerged from these circumstances, quite unimproved and extraordinarily ignorant. Psychoanalytic treatment was then begun, side by side with suitable teaching and education. . . . after two years he was able to do a good piece of work in proper time. The dream analyzed belongs to a time during the analysis when the youth had overcome the worst difficulties and the severest conflicts. . . . The dream runs as follows: [I omit the first part, which is not here analyzed and also the gathering of associations, quoting the analysis made from them.] *"With a bicycle, we* [dreamer and his sister] *then rode further, to the lake* [*in Zurich*], *where we met O. and a man on horseback in a green uniform. He rode on a horse that had a beautiful blue coat. Before he came to the bridge he dismounted and showed the left foreleg of the blue horse to a boy, who suddenly appeared. Afterwards some gentleman spoke to us about Dr. D. and spoke of a check number which he had taken by mistake. I then offered to take it with me* [*to the doctor who lived in a higher part of the town*] *but he said he had already arranged something with his sister.*

" . . . According to the dreamer, the scene with the blue horse is the center of interest in the dream, the emotional interest is very strong here. It is necessary to remark that the horse has much significance for the dreamer himself and for his whole environment.

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. . . If we use the material, thus obtained [through the associations], for interpretation, we find, in the first place, in the surface layer, on the objective level (to use Jung's excellent expression) the following:

"The blue horse is the beloved. . . . The horse represents more —the girls who have a magnetic effect, the mother, whose sexual significance is brought out by the scene in the bath during childhood [according to the associations].

"The green officer, his model, is the dreamer himself, who rides the horse, his beloved, with whom he made the tour (ride) that time. A parallel to this is furnished by the first part of the dream. . . . His sister, who here replaces the beloved, is the one with whom he carried on most of his childish tricks and for whom he has a strong transference.

"The officer examines the horse with the boy. The latter [a stable boy] is also identified with the dreamer, . . . his meaner ego. . . . By the choice of this symbol the dreamer measures his own value, saying 'I am also a low down fellow.' . . . One has been riding the horse too hard. In the same association we have also the masturbation, against which our dreamer has been fighting in vain for some time. . . . Accordingly, the dreamer is also identified with the horse. . . . And so we have arrived at the lower stratum, what Jung calls the subjective level. The horse becomes a symbol of the libido; a symbol of his own libido. In this stratum, note well, all symbols refer to the dreamer himself, and they are to be regarded as personifications of the different tendencies of his psyche. What on the objective level was regarded as the symbol of the beloved, becomes, on the subjective level, a symbol of that libido which has a tendency towards the object (the tendency is symbolized by its goal!).

"This part of the dream tells us then: L. (the dreamer) has ridden too hard, something is not right with me, and must be looked into. . . . That is to say, insight is dawning on the mind of the dreamer. After external separation from the beloved, . . . he was still intensely bound up in her internally. Because of the analysis he feels impelled to break with her, as he gradually came to see—although merely intellectually—how harmful their adventure had been for his development. . . . Inwardly he was not willing at the time to break with her; but he hid himself and his opposition behind me, the scapegoat. This dream shows us a further step. . . . His insight into his situation, the correct valuation of his adventure, becomes at the

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time of the dream emotional, not merely intellectual. This insight with the double character of intelligence and affect, is very significant and forms a cardinal point in the cure by analysis; for whoever possesses this insight is really acting on his own principles and conviction and thereby occupies a different relation towards the analysis from at first. The physician is no longer one who asserts this or that; something which one accepts or rejects, according to the predominance of the positive or negative attitude, but he has become a leader who sees and points out what one carries in oneself and only recognizes with difficulty; the physician is now he who helps one to know oneself better and how to rule oneself. . . .

"The last part of the dream which deals with the conversation about the doctor and the number, is little plastic in its manifest content, and is poor also in its latent content. . . . An entire side of the problem of the development of the libido in the youth is still untouched, he is not yet capable of clearly viewing the realization of the insight he has won, much less of bringing it to pass. . . . This . . . segment is [for Maeder] a symbolic expression of the future and as yet insufficiently elaborated material. . . . The principal stress of the manifested dream is laid on the wonderfully beautiful blue color of the horse, by which, in his opinion, is expressed how . . . great an attraction enjoyment still holds for him. This picture contains a valuation, which may serve as a standard for the dreamer's attitude. The task before the dreamer is the conquest of the kingdom in which the reality principle, to use Freud's excellent expression, reigns. . . . This is a point of cardinal importance in the analysis. It . . . indicates . . . the beginning of upward progress.

" . . . The psychoanalyst does not appear merely as physician in the last part; but also in the middle portion of the dream, namely, hidden behind the boy and probably also under the form of the officer. These two conduct the examination. The dreamer's identification with the boy points to the negative side of the transference he feels towards his physician; the physician takes the place of the father whom the dreamer fears. . . . But gradually the physician has become to the youth a model in some points. . . . Thus the dreamer identifies the two models. . . . I must add that the youth was advanced considerably through this analysis, and that he attacked the further solving of his problem with great earnestness."

Maeder's consideration of the dream in this aspect by no means denies the existence of a close connection between the latent and the manifest dream content. We can see here how both belong to the

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complete picture and the manifest content, as he states, can be valued and interpreted only by means of the latent dream material. The affect also, which accompanies the dream, as the above analysis shows, gains in this way a distinct value in recording the patient's progress. Particularly it expresses that most important step in the treatment, the passing over from a mere intellectual acceptance of the facts of the analysis, whether in interpretation of the underlying complexes or in recognition of the task to be accepted, to an emotional appreciation and appropriation of the same. *Intellectual acceptance can work no cure* but may prove seriously misleading to the patient who is attempting to grasp the situation and to the beginner in analysis as well. Therefore the value of this function of the dream in bringing not only to the analyst but more significantly to the patient himself the realization that the self-revelation and the actual life task in its concrete forms is being seized upon by the wish nature. For thus they become a part of that unconscious which Bergson so impressively describes "leaning over the present . . . pressing against the portals of the conscious" in order to "further" the work in hand for the individual in his share in racial achievement.

The seriousness of the task with which the psychoanalyst is confronted would be overwhelming were it not for the nature of the material with which he has to deal. This it should be remebered is dynamic and plastic. The very method which psychoanalysis employs enables one to take this material bit by bit, slowly, cautiously, the greater vision as well as the dynamic possibilities for good or ill always kept in mind, and by careful detailed work search out the libido lost in its regressions and remove the encrustations often of a lifelong maladjustment. Then, still through the analysis largely effectual on this side also by means of the dream, as we have seen, this libido is guided and stimulated to the acceptance and successful accomplishment of life's tasks. One enters through that recognition on the part of the conscious of the long divorced forces of the unconscious into a mutually intellectual and emotional knowledge of oneself, which means at last a true valuation of oneself. The libido is indeed free.

The magnitude of this task together with its infinite reward to both patient and physician has urged upon me minute details of caution and of direction. I have tried to show the value of a participation on the part of patient and physician in the greater cosmic view both of the origin and development of that unconscious which must be investigated, as well as of its potentiality for the future of the

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race. There is necessary, likewise, the detailed appreciation of the individual effort to realize his position in society, his failure or success in handling the forces within him, and the guiding of his libido trends into a successful adaptive relation to cosmic progress.

He fails, as we have seen, principally through the difficulty which persists with individual and race alike, the difficulty of severance from the past and of entering into an independent creative attitude toward the present and future. This problem is a very concrete one because of the love relation in which life begins and through which alone, in its broadest sense, progress continues. Therefore the problem resolves itself very definitely into the "family romance" situation, or in Freud's classic term the Œdipus situation. For this reason the psychoanalyst must recognize and accept the transference phenomenon as the most important manifestation on the part of the patient and learn to use it as the most powerful factor in receiving the patient's groping after assurance and health, that is after an effectual adaptation to reality, and use this bridge actually to transfer the libido striving into reality and the life task.

The attempt has thus been made to point out the great trend of psychoanalysis and to set up a few guiding posts for the physician who would place himself actively in this movement. One thing further must never be lost sight of. The existence of the unconscious, though in one sense merely a pragmatic hypothesis, yet represents an undeniable and inescapable fact. We do "desire, will and act" with our past. It is preserved in some way and preserved for some useful purpose. This immeasurable and unfathomable past cannot, however, be allowed complete nor unguided control. There must be direction and regulation. Hence the need to understand it, its content and its history and how to utilize its affective value. Hence also the external barriers and restrictions which culture throws out from time to time as guides and limitations to aid in its control.

These are indispensable aids but they are not fixed. This past is the product of a stream of energy which so far as we are concerned is inexhaustible. It has not expended itself in building up the past, it contains unmeasured resources for the future. The millions of years back to the colloidal ooze only point to the millions of years ahead to we know not what. We only know that infinite possibilities of development lie before us which must continuously outgrow external barriers and limitations and form new ones. We know also that the thwarting of the creative impulse as it tries to

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express itself in the various libido trends causes illness in any of the bodies activities and that these barriers sometimes exceed their usefulness and increase to too great an extent the existing repression and obstruction.

Society's great task therefore is the understanding of the life force, its manifold efforts at expression and the ways of attaining this, and to provide as free and expansive ways as possible for the creative energy which is to work marvelous things for the future. It is peculiarly the physician's task also to understand the failures and, searching out their causes, to bring back the misdirected energy to racial service and individual health and happiness. The reward is twofold and it comes in the direct path of detailed psychoanalytic service. It lies in the bringing of the individual into liberating self-knowledge and thus into racial achievement; it moreover establishes the physician himself in a vital contact with the unconscious, the great energic source of all that life means, and it compels him to swing into line with cosmic progress and its creative possibilities. His is no small share in freeing and directing the energy whether in his patients or likewise in himself and in setting it to the molding and forming of reality.

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OF

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AN AMERICAN MONTHLY JOURNAL OF NEUROLOGY AND PSYCHIATRY. FOUNDED 1874

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Volume 47, beginning January 1st, 1918

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Volume V January, 1918 Number 1

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NEW YORK AND WASHINGTON

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TRANSLATOR'S PREFACE

In the original French "The Internal Secretions and the Nervous System,"[1] by Prof. Laignel-Lavastine, is a classic. The translation is crude and without literary merit, and its only virtue is that a sincere attempt has been made to preserve its scientific value.

As proper innervation of the internal organs is necessary for health, and considering that there is an intimate relationship between the ductless glands and the nervous system, the proper understanding of the subject is not only of interest to the neurologist but to the general practitioner as well.

Organotherapy dates back to remote ages, as Dr. Diner has stated in his introduction. The Chinese treated obesity with preparations made from canine orchitic extracts and heart disease and epilepsy with dried and powdered frogs and newts. It has been shown by Abel's investigations that the skins of these animals contain an appreciable amount of adrenalin owing to the presence of cutaneous adrenals. To-day suprarenal extract is used in certain forms of heart disease and epilepsy with excellent results. Moreover we have no other adequate treatment for eunuchoid obesity than the administration of orchitic extracts. It would seem that modern medical knowledge is not the only healing art that was ever practiced. Empirics they were perhaps, but be that as it may "There were Kings before Agamemnon."

If the renewed interest in endocrinology has done nothing else for the art of medicine it has shown the utter futility of regarding physiology and pathology en masse. It is the individual and the study of the individual that is of supreme importance. Everyone has his own proper physiology and his own proper pathology as well. Following along their lines his life takes its course. That there are a broad common physiology and pathology none can deny, but that each individual has his own physiological and pathological variant is also not to be questioned. There is no truer saying than that "what is one man's meat is another man's poison," and it is the disregard of this fact that has hampered the advance of medical

[1] Article written in July, 1914, for the Congress at Berne, which did not take place on account of the War. I here publish the entire text, just as it was given to the Revue de Medecine in July, 1914.

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diagnosis and therapeusis for years. Whether it comes under the heading of mechanistic physiology or vitalistic physiology it is the individual physiology that has to be carefully analyzed and considered before a proper appreciation of health and disease can be arrived at. Endocrinology has taught, and is still teaching us to analyze our cases by close clinical observation and research. In many ways Nature is a kind mistress after all, and even her misfits are frequently granted a modus vivendi which can only be appreciated by the right kind of clinical study. In the analysis of endocrinal disease a slipshod method is worse than useless. The family history, the previous history, the present history, the personal idiosyncrasies, likes and dislikes, physical make-up and appearance, in fact all that concerns the individual must be elicited, weighed and balanced even to the most minute detail. In this way alone can success be arrived at.

It would be presumptuous in me to enter into detailed descriptions of methods of endocrinological research which has been furthered by American observers. When the time is ripe for the publication of well-authenticated facts on the subject they will appear in proper form. I may be pardoned, however, in stating here certain conclusions which have been arrived at, and which have been confirmed time and time again.

A. Briefly stated the life of every individual is dominated largely if not wholly by his ductless gland chain.

B. Certain of these glands assume a preponderating influence on the morphology, physiology and pathology of the individual.

C. Certain tropisms are existent, so that we have the pituitary, thyroidal, adrenal, etc., type of individual.

D. Certain diseases, both of an acute and constitutional character, are welded, as it were, with the glandular tropisms, and belong to them, and are part of their distinctive pathology, either functional or organic. This is not only true of acromegaly, Basedow's disease or Addison's disease, but of many other diseases as well.

E. The glandular influence having so much to do with morphology, the physical make-up of the individual gives marked evidence of the glandular constellation under which he lives and has his being.

F. Within certain limits if the previous history of the individual be accurately known, his physical appearance can be approximately described, and his physiological and future pathological states can be predicted.

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Some of these conclusions need no defense, and will be acceded to by all who have given the subject even a moment's consideration, while others will not be admitted by all endocrinologists.

The results obtained in the experimental feeding of tadpoles are very significant. The small amphibia that were fed on thyroid gland developed into tiny frogs described as "petit vieux," and those that were fed on thymus grew into enormous tadpoles or "grand enfants." This experiment proves to some extent at least why taking two individuals of the same age, one may look like a premature old man, and the other have the appearance of unwarranted juvenility.

The physiology, psychology and pathology of the two will follow the thyroidal and thymic influences that have had such a marked bearing on their morphology.

Take for example the dominion of the pituitary gland on certain types of body structure. Giantism in youth, acromegaly in adult life and shrinking in old age. There are small pituitary types as well. The dominating influence of the pituitary makes for feminism in the male, just as the dominating influence of the adrenals makes for masculinity in the female. The thyroidal individual has his marked personal characteristics—his bright intelligent eye, his good clean teeth, his temperamental attitude toward life, his freedom from infectious disease except measles and typhoid and his tendency towards intestinal, certain forms of cardio-vascular and neurotic disturbances. The pituitary individual, easily recognized by his structural make-up, has his own peculiarities. He is musical, has an abnormally acute sense of rhythm and is prone to diseases attended by periodicity and to syphilis (Charcot joint—a local acromegaly). The adrenal individual has his strong masculinity, his tendency to hypertrichosis and pigmentosis, his liability to diphtheria, to hyperchlorhydria, to hypertension, to certain forms of pulmonary disease, to hernia and varicocele. These master types have their variants depending upon the influences of the other glands, especially marked in the gonads. The endocrine system has been well described as the ductless gland chain, and it is imperative to realize that every link counts. The clinical picture is never a simple one.

It will be through endocrinological study and investigation that we will come to a better understanding of humanity. We will see how within certain broad lines the life of the individual takes its course. We will understand perhaps what the world calls Fate.

F. T. Robeson

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TRANSLATOR'S INTRODUCTION

"Every man, from the highest to the lowest station, ought to warm his heart and animate his endeavors with the hope of being useful to the world, by advancing the art which is his lot to exercise; and for that end he must necessarily consider the whole extent of its application, and the whole weight of its importance."—JOHNSON.

In making the writings of Laignet-Lavastine accessible to those not familiar with the French language, the translator has certainly hearkened to the admonition quoted above.

The importance of the internal secretions, both as etiological factors and as remedial agents, is being recognized more and more and anything which adds to our understanding of this highly complex subject should be welcomed with open arms by the medical profession.

Organotherapy or the use of animal matter in the treatment of disease is not by any means a new addition to the medical armamentarium. It is the intelligent interpretation of the symptom-complexes arising from dysfunction of the endocrine glands and the rational application of the secretions of these glands which anew engages the attention of the medical research worker and clinician alike.

The indirect application of animal tissues and organs to the treatment of disease finds its first expression at the sacrificial altar.

In gray antiquity, medicine and religion went hand in hand. God only could cure diseases and those of his representatives who were close to him in his service, the high priests, were empowered to execute his will in this direction as well as in religious matters. History records that as far back as 2000–3000 B.C. the treatment of disease was in the hands of the priests in Egypt. In Greece the Asclepiades, the priests of the temple of Asclepias, were entrusted with this important function. And Moses transferred to the priests the knowledge of medicine which he accumulated in Egypt.

The Hebrew literature, while replete with medical information, gives but scant evidence of animal therapy. No doubt the term "unclean" which is so frequently employed as a prohibitive injunction with reference to food, hygiene and other matters, comes into play here and accounts for the scant use of animal matter for medic-

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inal purposes. In Joma, VIII, 6, we find that "One bitten by a mad dog was given the liver of the dog as an antidote" and the use of small doses of urine is passingly mentioned in another section, but whether to be taken internally or applied externally is not clearly stated.

However, if we cast our eye on the medical literature of other nations and peoples, we find no lack of evidences of animal therapy. Without making any attempt at chronological arrangement, I will merely cite a few instances.

The Papyrus Eberus recommends: human brain, half with honey and half dried, as a remedy against inflammation of the eyes. Dioscorides, first century of present era (II, 21), recommends the fried brain of the hare as a good remedy for the cure of "Tremor, Convulsions, etc." Sextus Platonicus (330 A.D.) recommends the fried brain of the hare given internally to aid dentition in children. Celsus (II, 31, 34) as well as Plinius (XXVIII, 60) suggest the use of brain of the hare for urinary incontinence. And Plinius. Dioscorides and others advise the use of brain of different animals for the treatment and cure of epilepsy.

The liver also plays an important part in the materia medica of antiquity. Besides the quotation previously mentioned, we find that Hippocrates speaks of the benefit to be derived from the use of sheep's liver and of goat's liver in the treatment of diseases of the uterus. Plinius considers human liver as indicated to combat epilepsy; and Scribonius Largus uses "a piece of liver from a suffocated gladiator" for the same purpose (epilepsy).

Herophilus (300 B.C.) employs liver in cases of dysmenorrhea and metrorrhagia, as does Plinius, who also finds it useful against cough, tachycardia and ascites.

Bile is employed by Hippocrates in gynecological practice in the form of suppositories to combat sterility, prevent abortions and to ameliorate dysmenorrhea and amenorrhea. Plinius uses bile as a cathartic internally and applies it externally in treating diseases of the eye and to remove warts. Sextus Platonicus treats dizziness, epilepsy and asthma by internal medication with bile. Orchitic substance is mentioned by Susruta (400–600 B.C.) for the treatment of obesity.

Particularly rich in information on the subject of organotherapy are the writing of Dioscorides. Thus we find that the blood of doves and wild hens is a valuable remedy against recent injuries of

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the eyes, against hemorrhages and in many other pathological conditions. The blood of doves is especially valuable in hemorrhages of the brain, while the blood from other animals, such as goat, sheep, rabbit, etc., fried in a pan and taken internally, cures or stops dysentery. Blood from land-turtles is a sure cure for epilepsy. Menstrual blood prevents conception when painted in a circle around the body (abdomen?) or if one steps over it (blood). When rubbed in as a liniment it removes podagra and roseola. Feces of different animals also finds manifold uses. So for instances it is indicated to reduce inflammations, remove scrophula and gland-enlargements, correct prolapsus uteri, chase away mosquitoes, aid menstruation and to promote abortion.

Frogs prepared with oil and salt are a sure antidote for serpent's bite. Incidentally they cure painful tendons and stop bleeding when applied externally after burning and powdering them.

Testicle, dried and finely powdered, taken in wine is also used as antidote for serpents' bites but the beaver's testicle is especially valuable to help in bringing on the menstrual flow, aid abortion and promote expulsion of retained placenta. Incidentally it also finds its use in relieving cramps, convulsions and nervousness. Crabs, especially river-crabs, when boiled with honey are recommended for the removal of carcinomatous growths, and when boiled with meat-soup are indicated in the treatment of phthisis pulmonalis. Sea-crabs may be used for the same purposes but are less efficient. Lungs, especially fox's lungs, dried and taken internally cure asthma. And finally Dioscorides recommends urine for a number of diseases. So for instance is one's own urine good against serpents' bites; that from a mad dog against the bite of the dog, while the urine of an innocent boy, taken internally, cures orthopnea. Urine is also employed in various forms against eruptions, dysmenorrhea, pains in uterus, earache and urinary calculus.

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AUTHOR'S INTRODUCTION

The relations of the internal secretions and the nervous system constitute an immense subject, which requires to be classified and condensed in as short a report as this to escape the penalty of remaining under vague generalities.

The most recent and important work issued on this question is the second edition of the remarkable production of Professor Arthur Biedl, "Innere Sekretion, ihre physiologischen Grundlagen und ihre Bedeutung für die Pathologie." It contains, perfectly classified, all that has appeared of interest on the internal secretions up to the year 1913.[2] The physiological researches and experiments are herein particularly well set forth.

As I have the honor and the pleasure of having Professor Biedl himself as co-reporter, I would show poor taste in not leaving it to him to demonstrate the physiological part of the question.

I shall limit myself then to the pathological part. From a pathological standpoint the relations of the internal secretions and the nervous system are far from being completely cleared up, as one may gather from the recent reports of N. Pende,[3] G. Ghedini[4] and Parhon[5] at the congress of 1912 and 1913, and I have no hesitancy in stating with the Philalèthe of the Philosophical Dialogues of Renan: "For my part I am accustomed to classify my ideas on the subject in three categories. The first, unfortunately very limited, is that of the certainties; the second is that of the probabilities; the third is that of dreams. We will refrain from mentioning the last if you please, Euthyphron, as in all probability it exists for each one of us as the dearest part of all."

In fact, since my report of 1908 at the Congress of Dijon, on

[2] I refer here for the bibliography, also to the recent volume of Pr. Gley, Les Secretions internes, Baillière, 1914.

[3] N. Pende, Les sécrét. int. en rapport avec la clinique, XXII Cong. de la Soc. italienne de med. int., Rome, oct., 1912.

[4] G. Ghedini, idem.

[5] Parhon, Les gl. à sécrét. int. dans leurs rapp. avec la psychol. et la pahtol. mentale, rapport, Congrès internat. de Neurol., Gaud, 1913.—Voire aussi: Parhon et Goldstein, Les sécrét. int., Maloine, 1909; W. Falta, die Erkrankungen der Blutdrusen, Berlin, 1913; Lucien et Parisot, Gl. surr. et org. chromaffines, Gittler, 1913; Lewandowsky, Handbuch der Neurologie, Bd. IV, Innere Sekretion und Nervensystem, Berlin, 1913. See more complete Bibliography in Jelliffe and White, Diseases of the Nervous System, I, Endocrinology, 2d Edit., 1917.

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psychic troubles caused by disorders of the glands of internal secretion, where I insisted on the importance of these glands in neurology and psychiatry, the glands of internal secretion, heretofore ignored, have now become the special study of medical men, so that all or nearly all of them, clinicians, anatomico-pathologists, experimenters and therapeutists started investigating and consequently to-day one invokes with too much facility their disturbances as a causative factor each time one is puzzled. Next to the sympathetic, the abnormalities of which were more dwelt upon than was warranted, the endocrine glands have become the maids of all work of physiopathology.

It seems wise to me to expostulate against this excess. It has a tendency in effect to prejudice against endocrinology such critical minds which are more impressed by the lack of strict truth and the foundation of vagrant theories than by the biological interest of precise facts, verified over and over again.

In this question of the relationship of the internal secretions and the nervous system one should be assured above all of the reality of the facts under consideration, then these should be analyzed as to their details in order to grasp their divers elements, and to unravel their component parts, finally one should not extend their reach beyond the conditions that determine them, extrapolation not being generalization.

From the standpoint of pathology as from the standpoint of physiology the relations of the internal secretions and the nervous system interest us in so much as they are relations of causality.

My first aim then is to show that in pathology there exist, on the one hand, nervous disorders due to disturbance of the internal secretions, and on the other hand, disturbance of the internal secretions due to nervous disorders.

Before establishing this double relationship it is necessary to define exactly the terminology. Nervous troubles mean to me all the disturbances of the nervous system, the motor symptoms, sensory symptoms, trophic and psychic symptoms with their anatomical, physical and chemical correlations. These disorders are divided into three groups according as to whether they pertain to the sensory-motor, vegetative or psychic functions.

The sensory-motor disturbances are above all the expression of the neuraxis, the vegetative of the vago-sympathetic, and the psychic of the cerebral cortex.

One knows that Langley has differentiated in the vegetative

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system that which he calls the autonomic from the sympathetic system. This consists of the cephalic portion which proceeds from the mid-brain and the bulb—the oculomotor nerve, the pneumogastric and the chorda tympani—and of the sacral portion running from the cord—the pelvic nerves. This system, of which the ruling element is the pneumogastric, presents a functional antagonism to the sympathetic.

Thus, for example, the sympathetic dilates the pupil, causes the eyeball to protrude, accelerates the heart action, inhibits the movements of the intestine, dilates the sphincter ani, produces glycosuria and polyuria. Inversely the autonomic system contracts the pupil, relaxes the zonule of Zinn, slows the heart action, contracts the muscles of the intestine, increases the gastric and pancreatic secretions.

Eppinger and Hess[6] have striven to demonstrate this in man by the aid of pharmacodynamic tests, injections of adrenalin, of pilocarpine and of atropine. They have given the name of vagotonics to individuals in whom the activities of the autonomic predominate and of sympathicotonics to individuals in whom the sympathetic excels.

Adrenalin dilates the pupil, contracts the blood vessels, accelerates the heart action, increases arterial tension, produces polyuria, glycosuria and reflex excitability.

Pilocarpine incites salivation, sweating, blushing, increase of intestinal peristalsis, hypersecretion of digestive fluids and intestinal juice.

Atropine dilates the pupil, stops secretion, and sometimes accelerates the heart.

Eserine, introduced by Mougeot,[7] vago-excitant, slows the pulse, raises pressure, and contracts the intestine.

One speaks of adrenalin as exciting the sympathetic, of pilocarpine and eserine as exciting the autonomic, and of atropine as paralyzing the latter.

When a subcutaneous injection of one milligram of adrenalin produces a glycosuria in excess of 5 grams, when the quantity of urine is doubled and the pulse has a rhythm one third above normal, one speaks of sympathicotonia.

[6] H. Eppinger et L. Hess, Zur Pathologie des vegetativen Nervensystems, Deutsch. Arch. f. klin. Med., 1909, LXVIII, 3–4, p. 231. See Monograph No. 20, this series. Translated by Kraus and Jelliffe.

[7] Mougeot, A., Le réflexe oculo-cardiaque, Soc. de Med. de Paris, 28 mars, 1914, pp. 277–287.

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When a subcutaneous injection of one centigram of nitrate of pilocarpine produces a salivation and sweating more abundant than normal one speaks of vagotonia.

When a subcutaneous injection of one milligram of the neutral sulphate of atropine produces a rapid and prolonged dilatation of the pupil with considerable increase of the pulse rate one speaks again of vagotonia.

When finally a subcutaneous injection of a quarter of a milligram of hydrobromate of eserine does not produce an appreciable slowing of the heart nor contractions of the intestines one speaks either of hypovagotonia or sympathicotonia.

The oculo-cardiac reflex, discovered by Aschner, allows one also to take notice of the respective activities of the sympathetic and pneumogastric

In the normal state and in the recumbent position, pressure on the eyeballs with the pulp of the fingers softly for 30 seconds without pain, determines after the lapse of a few seconds a slowing of the pulse, lowering of arterial tension, slowing of the respiration and sometimes a feeling of nausea.

The reflex is positive when the slowing of the pulse is in excess of 12 beats per minute.

It is normal when the slowing is at least 4 and less than 12 beats per minute.

It is negative when there is no reaction or one of less than 4 beats per minute.

It is inverted when, without excitement or pain, the slowing of the pulse is replaced by acceleration.

When the reflex is positive, one speaks of vagotonia; when it is negative or inverted, of sympathicotonia.

Thus, thanks to these researches, two clinical types among the vegetative neurotics are clearly determined.

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CHAPTER I

The young girl, who complains of palpitations and precordial pains with slight tachycardia, burning pains in the stomach, diarrheas and sweating attacks, in spite of being chilly and having cold feet; who has profuse lachrymation, who is often nauseated, and who has tendencies to be sick especially before her periods, who is easily seasick, who dislikes to ride backwards in a carriage or railroad car; who with a large palpebral fissure has a slight exophthalmos; who has a clear von Graefe's sign without the sign of Möbius; who has an abnormally low arterial tension, with perhaps an eosinophilia; whose overcontracted pupils are not dilated by adrenalin, and which contract with expiration (Samogyi's sign); who has an alimentary glycosuria with adrenalin; who has secretory crises with pilocarpine; and finally who is benefited marvellously by atropine as regards dyspeptic troubles, and whose constipation disappears at once—she is a vagotonic.

The woman with a well-marked tachycardia and few subjective symptoms; with exophthalmos and no von Graefe's sign, but with a clear sign of Möbius; with a large pupil and scanty lachrymal secretion; who has no sweats or diarrheas; with very marked loss of hair, with a tendency towards fever; who is always too warm; whose pupil dilates with adrenalin, who also has an alimentary adrenalin glycosuria; who does not react to pilocarpine, and stands atropine badly—she is a sympathicotonic.

This differentiation, true in general, has aroused many criticisms from the very first, especially from Fleischmann,[8] Potzl, Eppinger and Hess themselves,[9] Falta, Newburgh and Nobel,[10] Falta and Kahn, [11] Petren and Thorling,[12] Burstein[13] and Bauer,[14] etc., the justice of which has been admitted by myself and my interne Mlle. Romme at Beaujon Hospital.

It is thus that we have seen intense reactions to pilocarpine at the same time that adrenalin shows an exaggerated excitability of

[8] Fleischmann, Med. Klinik, 4 fev., 1910.
[9] O. Pötzl, H. Eppinger et L. Hess, Wien. klin. Woch., 22 dec., 1910.
[10] W. Falta, L.-H. Newburgh et E. Nobel, Zeitschr. f. klin. Med., 1914, LXXII, 1-2.
[11] W. Falta et F. Kahn, Zeitschr. f. klin. Med., 1912, LXXIV.
[12] K. Petren et I. Thorilng, Zeitschr. f. klin. Med., 1912, LXXIII, 1-2.
[13] M. Burstein, Med. Obozr., 1912, LXXII, 10.
[14] J. Bauer, Deutsch. Arch. f. klin. Med., 1912, CVII, 1.

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the vegetative system, the same individual presenting at intervals of some days different reactions, and adrenalin glycosuria has no value until the hepatic element is eliminated.

Finally I wish to state that the term tonic or tone does not seem to me well chosen, because it deals more with an exaggeration of the excitability of the nerve rather than an increase of its tonicity, and these two states are far from being always parallel.

Be that as it may, I differentiate in nervous disorders in addition to sensory-motor troubles and psychoses, the disorders of the vegetative system, and these sympathetic and autonomic abnormalities. We shall see later on that these disorders do not separate themselves into parallel series as simply as the theory would have them do. Then again many trophic disorders observed in endocrine syndromes are not actually trophoneuroses. It seems quite often that endocrine commotions reëcho on the morphology through a humoral intermediary and not through a nervous one. Nevertheless, as I can not dissociate in the actual enumeration of the trophic disorders those that have a nervous intermediary from those that have none, I will discuss them all, later on indicating how they may be distinguished.

Commotions of the internal secretions should include the disturbances of all the internal secretions, that is to say, all humoral pathology not to say all the pathology, because every cell from a cytological standpoint is a gland of internal secretion, and following Renault, who showed the secretory value of the cells of the conjunctivæ, Nageotte, just recently by mitochondrial methods, has demonstrated the secretion of the neuroglia, which was thought formerly to be a simple tissue of support.[14a]

In order to be brief, and admitting the three distinctive conditions, histological, chemical and physiological, of the glands of internal secretion, claimed by Gley[15] at the recent Congress of London, I will only picture among the internal secretions those that depend upon definite glands, in the front ranks of which I will place the classical hemato-vascular glands: thyroid, parathyroids, pituitary, suprarenals, ovaries and testicles.

I will add to this group the pineal, which in the infant, histologically as well as physiologically, is an endocrine gland; the choroid plexus, of which the secretion diffused in the cerebro-spinal fluid has been demonstrated by Pettit and Girard; the prostate, whose

[14a] See Translation of Achucarro, Jl. Nervous and Mental Disease, Oct., 1918, p. 333.

[15] E. Gley, Relat. entre les organes à sécrétion int. et les troubles de ces sécrét., Rapport, sect. de Physiol., Congrès internat., Londres, 1913.

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elective action on the genital organs has been brought in evidence by Hallion, Papin and Morel[16] and the paraganglia of the sympathetic, which are chromaffin organs apart from the suprarenals.

In addition among the glands of external secretion, certain ones have at the same time an internal secretion of such importance that I must at least mention them; such are the liver, the kidney, the pancreas, the salivary glands, the mammary glands and the intestinal glands of which the endocrine action has been grasped histologically by P. Masson.[17] Among these I will retain only the pancreas on account of its participation in the mechanism of glycosurias.

Finally among the lymphoid glands, ganglia, thymus and spleen, the thymus at least plays a secretory rôle.

I will consider then the nervous disorders linked with disturbances of the thyroid and parathyroids, the thymus, the suprarenals and paraganglia of the sympathetic, the pancreas, the pituitary, the pineal and the choroid plexus, the ovary, the testicles and the prostate.

In this clinical analysis I shall recapitulate at first in a critical review as briefly as possible the nervous disorders existing in the syndromes, that one as a rule places among the disturbances of the endocrine glands, that I have just mentioned, and reciprocally the endocrine disorders observed in the nervous syndromes.

In this critical review I will bring out the elements of an endocrino-neurological scheme, in which by the choice of certain nervous symptoms, certain endocrino-vegetative syndromes, certain traditional nervous syndromes, certain temperaments, certain characters, I will attempt to show by the method of double weighing, that some among them are determined by an endocrine commotion in certain cases, and that in others they are the expression of a nervous upheaval of different origin reacting secondarily on the internal secretions.

And I will gather from this rather suggestive study of a subject so complex and so obscure some conclusions which I will advance for your discussion.

[16] Hallion, Morel et Papin, Act. vaso-dilatatrice péniesme de l'extr. prostateq., Soc. de biol., 28 fev., 1913, p. 401.

[17] Masson, P., La gl. endocrine de l'intestin chez l'homme, Acad. des Sc., 5 janv., 1914.

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A. Critical Review

The endocrino-neurological clinical relationships form, a priori, two big groups:

1. Nervous disorders in the endocrine syndromes.
2. Endocrine disorders in the nervous syndromes.

Before discussing these I must explain the value of the methods of investigation which are permissible for proof. I will be very brief as regards the neurological methods and a little more explicit as regards the endocrinological procedures.

(*a*) *Methods of Neurological Investigation*

I skim over the current clinical methods employed for unravelling the motor, sensory, lisso-motor, secretory, trophic and psychic disorders of the nervous system to pause at the more complex experimental tests in clinical use to establish the so-called states of vago- and sympathicotonia. These tests are at the starting point chemical or mechanical. The first are the injections of adrenalin, of atropine, of pilocarpine, of eserine; the second are the ocular, auricular or solar ganglion tests permitting the consideration of the oculo-cardiac,[18] auriculo-cardiac and cœliac hypotensory reflexes.[19]

Now each of these tests determines a series of reactions already quoted.

In order to judge of their diagnostic bearing on the neurological status one makes three hypotheses.

The first, that the antagonism between the sympathetic and the autonomic is complete.

The second, that just one of the results of each of the tests, which one regards as characteristic, is representative of the general orientation of all the results of that test.

The third, that the orientation of the test so determined is of use for deciding not only the state of the function thus investigated, but the state of the whole sympathetic or autonomic nervous system.

Now as regards the first hypothesis one can reply that if pharmacodynamics bring the innervation of the sweat glands under the control of the autonomic, there is nothing in anatomy or physiology to permit it to be separated from the sympathetic.

To the second one can answer that the results so often dis-

[18] For the recent French bibliography, see: Vernet et Petzetakis, Le réflexe oculo-cardiaque, Gaz. des hôp., 2 mai, 1914.

[19] André, Thomas, et J., Ch. Roux. Soc. de biol., 23 mai, 1914, p. 857.

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sociated of adrenalin or atropine, raised blood pressure without glycosuria or vice versa, dilatation of the pupil without acceleration of the heart or vice versa, show clearly that one can not draw conclusions from the character of the physiological reaction, considering from the same standpoint the character of all the other possible reactions that one has neglected.

In a stronger way one should respond to the third hypothesis that the frequent confirmation of reactions in an inverse sense, of the vagotonic and sympathicotonic classification shows that one can not judge of such states from one single reaction, but further that the frequent confirmation of reactions in an inverse sense, sympathicotonic or vagotonic, that I have often observed as a result of different tests and even of the same test, shows at least the association or the succession of these two states of the vegetative system, and in consequence diminishes, if not the importance of the doctrine, at least the practical interest of this classification, of which the clear-cut outlines and the antagonism seem to have been exaggerated.

(*b*) *Methods of Endocrinological Investigation*

These methods are clinical, anatomical, organotherapeutic, physiological and chemical. In my report of 1908 I have shown the inherent causes of error in the first three.

Clinically one must not in an endocrino-neurological complex, of which the groupings may be more or less defaced, pick out as an element of causality that which perhaps is nothing more than a co-result of the same cause or which has nothing but a contingent relationship with the nervous or endocrine disorder.

In anatomo-morphological pathology one gathers facts of incontestable value, and that is why I have continued[20] to examine systematically the endocrine glands of my nervous and mental cases, but as I said in 1908 one must always know how to read, and how to interpret these data; to read them, that is to say, ob-

[20] Laignel-Lavastine, Hyperplasies glandulaires de l'hypophyse. Congrès de Neurol., Amiens, 1911.

Laignel-Lavastine et Duehm, Les parathyroïdes chez les aliénés, Soc. de biol., 20 janv., 1912; 30 mars, 1912; Annales de Méd. (sous presse); Les parathyroïdes chez les déments séniles, Soc. de psychiatrie, avril, 1912; M. Labbé, Laignel-Lavastine et Vitry, Diabète et lésions du pancréas, Soc. anatomique, 8 mars, 1912.

Laignel-Lavastine et V. Jonnesco, L'hypophyse des psychopathes, Soc. anatomique, 30 nov., 1912; Encéphale, janv., 1913, pp. 25–45. Trois planches couleurs.

Laignel-Lavastine, Anat. pathol. de la pinéale, Mém. couronné par l'Acad. de Méd., 1913, Arch. de Méd. exp. (sous presse).

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serve the physiological, ethnic or geographical[21] variations, the errors of technique, the post-mortem lesions, in order to distinguish the normal from the pathological; to interpret, that is to say, to distinguish in the pathological lesions those which are contingent, and are recent alterations due to terminal accidents, or which are but a co-effect resulting from the same cause as the nervous disorders, or results of a previous infection or intoxication, in order to be able with these lesions to establish beyond criticism a causal relationship between endocrine disorders and nervous symptoms.

Besides a last difficulty which is considerable renders these researches sufficiently rare under ideal conditions. The glandular disorders, which for the sake of argument one supposes to have reacted on the mental condition, are seldom severe enough to result in death.

A long time elapses between the onset of the trouble and the autopsy. Thus on the one hand additional lesions due to the pathological overcharge can render old glandular lesions unrecognizable, and on the other hand nervous and psychic symptoms born of a glandular disorder, which is often transitory, may outlast this disorder indefinitely.

These examples of nervous and above all mental sequelæ of a functional upset, which has ceased for a long time, are relatively very frequent illustrations of the great law of habit.

In organotherapy[22] when it is a question of establishing a relationship of causality between a nervous disturbance and an endocrine disorder, because the administration of the extract of an incriminated gland has been followed by the disappearance or at least the attenuation of the nervous syndrome under consideration, it behooves one to be even more careful than in any other therapeutic induction, being aware already of the many fallacies of such because here the causes of error are particularly numerous: coincidence; general action on the organism and its metabolism by simple pharmaco-dynamic effect; suggestion; variability of the organotherapeutic extracts according to the method of acquisition, of preparation, of conservation, their age, the mutation of effect according to dosage, the avenue of introduction, the frequency of dosage, the difference between their action and that of the normal

[21] Il en est ausi pour la thyroïde. V. Parhon, Mlle. Mateesco, Tupa, Nouv. recherches sur la thyr. des aliénés, Encéph., août-sept., 1913, pp. 139 et 235–55.

[22] Hallion, L., La pratique de l'opothérapie, 1911.

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gland, the uncertainty indeed of the nervous syndrome being in line with the endocrine disorder, which in other respects may not have induced the nervous syndrome except through the agency of glandular commotions in one or many other of the endocrines, observing as well other intermediaries such as mechanical, physical, chemical, humoral, nervous or psychic causes.

In his report of 1913, Gley reiterated the causes of error in insisting upon the general toxicity of organic extracts and their variations, depending upon the method of preparation, autolysis, the production, the manner in which they are used, the heating and the quickness of injection. In addition he has drawn attention to a new cause of error: tachyphylaxis,[23] rapid immunization characterized by the fact that successive injections of organic extracts in small doses gives rise to an immunization that is produced in a few minutes. This phenomenon of tachyphylaxis for one organic extract can be aroused by the extract of another organ and vice versa. This crossed tachyphylaxis of Gley and Champy should be taken into consideration in the interpretation of such complex results as the effects of treatments by simultaneous or successive associations of glandular extracts. From this standpoint the theory of treatment by hormones[24] is guarded from such causes of error because the hormones entail neither anaphylaxis nor tolerance. In the above we have an instance of one of the differences between the action of adrenalin and that of extracts of the suprarenal gland.

Finally the new physiological methods, methods of Abderhalden, methods followed by Gley and Claude, etc., are themselves no longer shielded from causes of error.

The Abderhalden method has already been applied by numerous authors, Urechia,[25] Pesker,[26] Parhon,[27] Obregia and Pilulesco,[28] Marinesco and Papazolu,[29] Mutermilch,[30] etc., to induce from their results an endocrinological origin for numerous nervous and mental syndromes.

Only recently, following his researches on the relations of the

[23] Gley et Champy, Soc. de biologie, 1911, 22 juillet, p. 159; Gley, Livere jubilaire du Pr. Richet, 1912, pp. 111–29.

[24] Hallion, L., Sur la part attribuable aux hormones dans les effets de l'opothérapie, Soc. de thérapeutique, 26 nov., 1913, pp. 472–77.

[25] Urechia et Popeia, Soc. de biol., Bucarest, 20 dec., 1913, p. 591.

[26] Pesker, Ass. scientif. des med. de l'Ass. psychiatrique Saint Nicholas a Saint Petersbourg, 10 janv., 1914.

[27] Parhon, et Parhon, M., Soc. de biol., 25 avril, 1914.

[28] Obregia et Pitulesco, Soc. de biol., Bucarest, 31 janv., 1914, p. 316.

[29] Marinesco et Papazolu, Soc. de biol., Bucarest, 29 mai, 1914, p. 1419.

[30] Mutermilch, S., L'applicat. de la réact. d'Abderhalden au diagnostic et à l'état des mal. nerv. et mentales, Arch. de Neurol., avril, 1914, pp. 205–219. Bibliographie.

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internal secretions and the psychoses, Parhon, with Odobesco,[31] started to trace a psycho-endocrine syndrome characterized from the psychic viewpoint by great irascibility and ideas of persecution poorly systematized, and from a somatic viewpoint by ovarian disturbances, irregular menstruation or amenorrhea and especially thyroidal disturbances, congestion of the face, hot flashes, mononucleosis and a positive Abderhalden reaction for the thyroid.

Now Plaut has shown that in Abderhalden's reaction, kaolin talc, sulphate of barium produce dialyzable sustances which react with ninhydrin just as the protein does which has served in the preparation of the animal,[32] and H. de Waele concluded after a series of experiments that this ferment is unique: it is antithrombin. It is not the fragments of organs or proteins that undergo proteolysis but really the globulins of the serum. The specificity will simply arise from the preparatory injection which has created conditions favorable to the action of the protein on the globulins of the serum, and it appears probable that this bears a close relationship to the phenomena of agglutination and precipitation.

Even more recently Flatow[33] happened to show that it consists of simple variations of the proteolytic ferments of the serum. This study of antiferments for the diagnosis of endocrino-nervous relationships is, therefore, to my mind, extremely dangerous. In effect the recent criticisms of the Abderhalden reaction, in spite of the recognition of the gross chemical interest, put one justly on guard against its pretended specificity towards the extracts of organs employed.

I will then consider that the new investigations are not entirely conclusive relative to the existence of an endocrine factor, based solely on the Abderhalden reaction.

The physiological method advocated by Gley in his report for judging of the functional capacity of the affected organ consists of injecting into animals the altered tissue in order to see if it still manifests the physiological properties of normal tissue.

A priori, this method seems of value, and, as Gley says, "this type of study seems to recommend itself in a general way to pathologists. The anatomo-pathological research which allows certain lesions to be authenticated should be amplified." And as an

[31] C. J. Parhon et Gr. Odobesco, Encéphale, 10 juin, 1914, pp. 489–582.
[32] H. de Waele, Soc. de biol., 25 avril, 1914, p. 627, et Zeitschr. f. Immunitätsf.
[33] Flatow, A propos de la spécificité des soi-desant ferments protecteurs, XXXI Cong., allemand de med. int., Wiesbaden, mai, 1914.

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example he has cited his experiences with the cardio-vascular action of adrenal extract from thyroidectomized dogs compared with that obtained from normal canine glands. He did not note any difference. Porak, who has followed this route, has arrived at unexpected results. Suprarenal extracts obtained under conditions of activity clearly greater than normal have given cardio-vascular reactions of less intensity than those that were obtained under normal conditions. As the cardio-vascular effect is proportionate to the richness in adrenalin one must conclude that not only is the richness in adrenalin of the suprarenals not in proportion to their activity, but that taken at a given moment they are less charged with adrenalin than are less active suprarenal glands.

Thus because function wears itself out with persistence, and by fault of having overlooked the time factor, one has been exposed to erroneous deductions, in conclusions drawn from the physiological method, which a priori is valuable in itself.

It is good because, contrary to precedent, it is capable of furnishing answers during the life of the individual. Better yet because it seems to be the method followed by Claude and his pupils.

It consists of injecting divers glandular extracts into patients, and observing their reactions systematically, and deducing from these reactions the probable endocrine disorders. Thus it permits the acquisition of individual indicators of physiological endocrine reactions, which, counting on the complexity of the cases, by the comparison of a large number of facts, may allow the formation of hypotheses if not of conclusions. Claude with his pupils, Baudouin and Porak, has already used this method with success in the study of acromegalics, Addisonians and just recently of Basedowians.[34]

The many criticisms summed up by Biedl and Falta and Porak[35] have done full justice to the serological methods, such as that of Meltzer-Ehrmann, based upon the supposed fact that dilatation of the enucleated eye of the frog, in the presence of any serum indicates the existence of adrenalin in that serum. Mydriasis can be brought about by other causes than the presence of adrenalin. It is useless to argue further.

There remains the need of knowing how to interpret the results of the clinical, organotherapeutic, anatomo-pathological and physiological methods (Claude type).

[34] Claude, H. Baudouin, R. Porak, L'épreuve des extr. hypophysaires chez les basedowiens, Soc. méd. des hôp., 19 juin, 1914, 1112.

[35] Porak, L'épreuve de l'hypophyse dans les maladies des glandes à sécrétion interne., Thèse, 1914.

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I will now sum up the nervous disturbances in the endocrine syndromes and the endocrine disturbances in the nervous syndromes as rapidly as possible, because one finds them to-day explained at length everywhere.

1. Nervous Disturbances in the Endocrine Syndromes

Endocrine syndromes are increasing every day, perhaps because one finds definite endocrinal lesions in a syndrome till now confounded with an analogue, perhaps because one now erects at pleasure endocrine theories for divers affections of unknown origin. The first way is legitimate, although of a rather delicate interpretation—in fact we are all familiar with the frequency of lesions in the endocrine glands in all sorts of autopsies. The second is singularly fallacious when it depends only on experimental or clinical analogies or on debatable anatomical, humoral or therapeutic authentications. The syndrome of dystrophia adiposo-genitalis due to a pituitary lesion and precocious macro-genito-somatosis due to a pineal lesion are examples of the first. The endocrine theories as to the origin of seasickness, hysteria, Paget's disease, cholera are, in their turn, examples of the second.

In the beginning, in the period which might be called the uni-endocrine, each syndrome was connected with a lesion of one single gland, Basedow's with the thyroid, Addison's with the suprarenals, acromegaly with the pituitary, and in each gland only disorders of increase or decrease of secretion were seen (quantitative period).

In the meantime, after many others, I had shown with Thaon in 1905 a case of Basedow's disease in a woman with myxedema, which the simple quantitative theory could not explain.

Meanwhile, in 1904, in reference to a case of acromegaly with hypertrophy of the pituitary, the thyroid and the suprarenals, I and M. Ballet[36] attempted to explain these glandular reactions by claiming functional correlations among the endocrines, and I advanced the hypothesis of a humoral process.

Shortly after, Claude[37] insisted upon the existence of several endocrine reactions in acromegalics.

After this quantitative, uniendocrine organic period there followed the polyendocrine period, which is rendered memorable by the ringing memoir of Claude and Gougerot[38] on the pluriglandular

[36] G. Ballet et Laignel-Lavastine, Soc. de Neurol., juillet, 1904, R. N., p. 793.

[37] Claude, Soc. de biol., 28 oct., 1905, p. 362.

[38] Claude et Gougerot, Soc. de biol., dec., 1907, p. 785. Journ. de physiol. et path. gén., juin, 1908.

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syndromes pertaining to a tuberculous case with a testicular-adrenothyroidal insufficiency.

Subsequently on June 24 at my course at Laennec on the medical anatomy and physiology of the secretions I delivered a lecture, published afterwards,[39] on the correlation of the glands of internal secretion and their pluriglandular syndromes, and M. Renon[40] established a clinic at Necker.

Following this one spoke of nothing but pluriglandular syndromes, because really the disorders are hardly ever, if ever, limited to one gland exclusively. But after having been too limited, we exaggerated in the opposite sense. It is not logical, because the endocrinal disorders in the pathological state have many glandular echoes, as in the normal state the functional correlations run along in humoral harmony, to speak of pluriglandular syndromes when but two glands are involved.

In addition if classical endocrine syndromes such as Basedow's syndrome, Addison's syndrome and diabetes insipidus are often allied to a microscopical lesion of the thyroid, the suprarenals or the pancreas, sometimes these lesions lack emphasis, and one is forced to admit a nervous disorder reacting on these glands. It is this that I endeavored to demonstrate in my theses on the solar plexus,[41] where side by side in Addisonian syndromes with microscopic lesions of the suprarenals I published others without such lesions. As I have stated, a syndrome being the clinical expression of a disturbance of function, it is brought about either by a glandular lesion which controls that function or by a lesion of the nervous system, which regulates that gland. To the lesional contingency is opposed the functional necessity. All the cases which are not explained by the organic theory place themselves easily, on the contrary, in the physiological theory, which is much more comprehensive. Hence one must know how to substitute the single physiological or the qualitative or quantitative polyendocrine explanation for the quantitative organic uniendocrine interpretation which is the oldest and simplest.

To sum up, endocrine syndromes may depend not only on a lesion of a corresponding gland or of its regulating nervous mechanism, but indeed upon an upset of one or the other of an infectious or toxic origin; the glandular trouble may be not only quantitative but qualitative; it may depend not only on one gland but upon

[39] Laignel-Lavastine, Gaz. des Hop., 14 nov., 1908, pp. 1563–71.
[40] Renon, Journ. des practiciens, 25 juill., 1908.
[41] Laignel-Lavastine, Thèse de Paris, 1903.

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many, and in the latter case with predominance on one or on several of them, sometimes without appreciable clinical ascendancy. I will therefore enumerate the uniendocrine syndromes and the polyendocrine syndromes, and I will divide the latter into two groups according as to whether a preponderance in the disorders of certain glands can be differentiated or not.

From this enumeration of the endocrine syndromes it will become evident that endocrinogenous nervous disorders exist. The interpretation of facts is more delicate from the viewpoint of the Viennese School, which, in a parallel manner to the division of the vegetative system into sympathetic and autonomic systems, and after having admitted the relationship of excitation and inhibition of the divers glands, one on the other (the triangular schema of Eppinger, Falta and Rudinger reproduced everywhere), divides these same endocrine glands into two groups, of which one formed especially of the suprarenals, the thyroid and the pituitary excites the sympathetic, while the other formed especially of the pancreas and parathyroids excites the autonomic.

A. Uniendocrine Syndromes

The ensuing is the enumeration of nervous disorders noted in the divers syndromes as depending on the following endocrine glands: thyroid, parathyroids, thymus, suprarenals, paraganglia of the sympathetic, pancreas, pituitary, pineal, choroid plexus, ovary, testicle and prostate.

1. *Thyroid*

1. *Myxedema:* Arrest of development, dwarfism, infantilism, infiltration of the skin, mental torpor, dull ideation, defective memory, apathy, laziness, sluggishness, somnolence, taciturnity, awkwardness, slow, monotonous, raucuos, nasal voice; small pulse, rapid and irregular, sometimes with hypertension; constipation, scanty urine, subnormal temperature, chilliness, headaches, slight knee jerks; no alimentary glycosuria; sometimes epilepsy.

2. *Basedow's syndrome:* Tachycardia, arrhythmia, anxiety, pulsation of the arteries of the neck: exophthalmos, lachrymation. Von Graefe's sign (lack of synergy in the movements of the upper eyelid and the globe), Stellwag's sign (lengthening of the palpebral fissure and incomplete closure of the eyes), Möbius's sign (difficulty in convergence); facial paresis, a giving way of the legs, epilepsy, transient attacks of tetany, cramps, tremblings, ocular frontal headaches; colics, hot flushes, profuse sweats, intolerance of

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heat, vasodilatation of the skin, meningitic skin reaction, dermographia,[42] transient attacks of edema, pigmentations, urticaria, alopecia, diminution of electrical resistance, polyuria, albuminuria, glycosuria, anorexia, insatiable hunger, vomiting, ptyalism, hyperchlorhydria, diarrhea, rapid respiration, Bryson's sign (lack of deep inspiratory power), suffocation, amenorrhea, atrophy of the breasts, emaciation, agitation, emotional instability, volubility, insomnia, emotional stress, susceptibility, inquietude, anxiety, rage and sometimes anxiety neurosis, obsessions, anxious melancholy, cyclic insanity, restless excitement, depression, mania, melancholia, mental confusion, epilepsy.

Sainton[43] found among Basedowians sometimes signs of sympathicotonia: exophthalmos, adrenalin mydriasis, lack of lachrymal secretion, violent tachycardia, glycosuria, adrenalin reaction, an absent or inverted oculo-cardiac reflex; at other times signs of vagotonia: slight exophthalmos with enlargement of the palpebral fissure, Von Graefe's sign, increased lachrymation, abundant sweats, diarrhea, slight tachycardia, no alimentary glycosuria, positive oculo-cardiac reflex and a pilocarpine reaction; and at still other times a mixture of the two series.

He therefore admits of three forms: sympathicotonic, vagotonic and mixed.[44]

This seems to me to be the rule. Especially as I have had occasion to see a case where the oculo-cardiac reflex was at various periods sometimes positive, sometimes normal, negative and even inverted.

3. *Thyroidal insufficiencies other than myxedema:* Infantilism, obesity, Dercum's syndrome, pseudo-lipomatosis, alopecia, premature grayness, scleroderma, urticaria, pruritus, relapsing herpes, transitory edemas, migraine, asthma, constipation, muco-membranous entero-colitis, blueness of the extremities, Raynaud's syndrome, localized erythema, nasal asthma, carbohydrate tolerance, genital irritability, hypertrophy of the mammæ, chilliness.

4. *Thyroidal instability of Leopold Levi and Henri de Rothschild:* (*a*) With dyshypothyroidea predominating: chilliness, falling of the hair, headaches, despairs, weeping fits, giddiness, transient edemas, pains, spells of suffocation, shivering fits, hot flushes at the periods; (*b*) With dyshyperthyroidea predominating:

[42] Alquier, Rev. Neurol., 30 mars et 30 juin, 1914, pp. 393–401 et 795.
[43] Sainton, P., Journ. méd. français, 15 mars, 1914.
[44] B. Guillaumont, Le réflexe oculo-cardiaque dans le syndrome de Basedow, Th., 1914, p. 74.

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emaciation, heavy eyebrows, flashes of heat, feverishness, palpitation of the heart, intestinal spasms, irritability, emotivity, phobias, inquietude, overwhelming migraines, asthma, hyperidrosis, dysidrosis, tremblings; (*c*) Without preponderance: chilliness, chills, migraines, repeated trips to the toilet, migratory pains, "diffuses," "hemmage," redness of the eyebrows, catamenial neuralgias, anxieties, large palpebral fissure, swelling of the feet, variability in the size of the extremities, tremors, nervous crises, hysteria.

2. *Parathyroids*

1. *Tetany:*[45] Tingling and stiffness of the fingers, tonic intermittent spasms of the flexors of the extremities; flushings, temporary edemas of the joints, normal or increased tendinous reflexes, dyspnea, tachycardia, fever, salivation, vomitings, diarrhea, Trousseau sign (hand of the accoucheur on compression of the arm), Chvostek's sign (brisk and fleeting contraction of the skin muscles of the face on light percussion of the facial nerve, over the auriculo-labial course) and Weiss's sign (brisk contraction of the muscles of the forehead, eyebrows and eyelids on light percussion of the temporal branch of the facial at the level of the external angle of the eye); hyperexcitability of the nerves to the galvanic current, particularly to the closure of the negative current and the opening of the positive current.

2. *Parkinson's*[46] *syndrome?:* Trembling, muscular rigidity, propulsion, rheumatoid pains, sensations of heat, increased tendinous reflexes, vaso-dilatation, sweats, edemas, cerebral retardation, psychic depression, vertigoes.

3. *Thymus*

1. *Vagotonic symptoms*[47] *of Basedow's syndrome* (?): Profuse sweats, palpitations, lymphocytosis, eosinophilia, sensation of weakness.

2. *Myasthenia*[48] *of Erb-Goldflam* (?): Headaches, ptosis, ex-

[45] Tetanie, résultante d'une insuffisance parathyroidienne latente, congénitale or acquise, qui s'aggrave brusquement et devient manifeste à l'occasion d'une traumatisme, d'une infection or d'une intoxication surajoutée. Thèse de R. Lifschitz, 1914, inspirée par Babonneix.

[46] Le syndrome de Parkinson serait hypoparathyroidien et s'opposerait a la myasthénie, syndrome hyperthyroïdien? (Lundborg). Deutsche Zeitsch. f. Nervenheilk., Bd. XXVII, 1904, p. 217; voir de plus: Gautier, J., Th., Lyon, 1913.

[47] Rose, Le thymus et la mal. de Basedow, Sem. med., 21 janv., 1914, d'après Capelle et Bayer, Biedl, Klose, Lampé et Liesegang.

[48] La coincidence très fréquente d'une gros thymus chez les myasthéniques est certaine, Claude (Acad. de méd., juin, 1914) admet a l'origine de certains cas des lésions thymiques.

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ternal ophthalmoplegia, changing and fleeting paralyses confined mostly to the head and neck, myasthenic electrical reaction of Jolly (muscular fatigue by tetanizing stimulation).

3. *Thymoprivic Idiocy* (Klose and Vogt).[49]

4. *Tetany??* (Basch).[50]

4. *Suprarenals*

1. *Addison's syndrome and suprarenal insufficiency:* Asthenia, arterial hypotension, morning nausea, morning vomitings, lumbar pains, melanoderma, white skin reaction of Sargent, amyotrophia,[51] aboulia, sadness, sometimes: tetany, epilepsy, myoclonia[52] convulsions, periodic paralyses, delirium, mental confusion, coma, sudden death.

2. *Genito-suprarenal syndrome:* Feminine external pseudo-hermaphrodism with virile secondary sexual characteristics; suprarenal masculinism: amenorrhea, gynecomastia (excessive size of the male mammary glands), adiposity with discolorations of the skin, all signs of feminine maturity; in addition: hypertrophy of the clitoris, hypertrichosis wtih masculine distribution, masculine voice, increased muscular and nervous tonicity, violent character, "disorders of the mental state and affectivity may go as far as sexual inversion"[53] (Gallais); increased arterial tension, arteriosclerosis; glycosuria. "At the same time," adds Gallais,[54] "bizarre nervous and mental phenomena set in, near neighbors to maniacal excitement. The sexual instinct deviates: the character changes and becomes violent, authoritative, and crises of anxiety appear. Along with these crises and in the interim one notes vaso-motor phenomena."

5. *Paraganglia of the Sympathetic*

Chromaffin cells in the solar plexus, Zuckerkandl's aortic paraganglia, the cardiac paraganglion of Wiesel and Wiesner, Luschka's carotid gland, Luschka's coccygeal gland, the tympanic paragan-

[49] Klose, H., et Vogt, H., Klinik und Biologie der Thymusdruse mit besonderer Berücksichtigung ihrer Beziehungen zu Knochen- und Nervensystem, Beitrage klin. Chir., 69, p. 1, et Monographie, Tübingen, 1910 (505).

[50] Basch, K., Über die Beziehung der Thymus zum Nervensystem, Jahrbücher für Kinderheilkunde, 68, 1908.

[51] Sézary, Syndromes surréno-musculaires, Sem. méd., 5 fev., 1913.

[52] Laignel-Lavastine, Les formes cérébrales de l'insuffisance surrénal, Presse méd. d'Egypte, 15 mars, 1911, p. 89.—Frette, Th., 1913.

[53] A. Gallais, Le syndrome génito-surrénal. Thèse, Paris, 1913.

[54] A. Gallais, Diagnostic anatomo-clinique du syndrome génito-surrénal, Revue de gynécologie, janv., 1914.—Voir aussi: Truffier, Virilisme surrénal, Ac. de med., 27 mai, 1914.

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glion, are for the most part[55] chromaffin organs, and in this respect pertain to the suprarenal sympathetic system. Their disturbances, from the standpoint of nervous echoes, have not, as far as I know at the present time, recognized aspects which are peculiar to themselves.

6. *Pancreas*

Diabetes mellitus: glycosuria, polyuria, polyphagia, polydipsia, neuralgias, pruritus, impotence, constipation, scant salivation, scant perspiration, dry skin, testicular atrophy, amenorrhea, loss of tendon reflexes, increased arterial tension, asthenia, headaches, lessened resistance to cold, perforating ulcer, syncopes, attacks of apoplectiform coma, paralyses, vertigoes, asthmatic dyspnea, pseudo-angina pectoris, sommolent disorders of sleep, depression, apathy, hypochondria, coma.

7. *Pituitary*

1. *Froelich's dystrophia adiposo-genitalis syndrome:* Adiposity, arrest of development or retrogression of the genital glands, genital organs and the secondary sexual characteristics corresponding thereto; somnolence.

2. *Renon and Delille's*[56] *syndrome of pituitary insufficiency:* Tachycardia, instability of the pulse, lessened arterial tension, insomnia, anorexia, painful sensations of heat, increase in the secretion of perspiration.

3. *Acromegaly:* "Marked hypertrophy, not congenital, of the upper and lower extremities and of the head," pain in the head, amenorrhea, tendinous reflexes never exaggerated, arrhythmia, syncope, sweats, polyuria, glycosuria, lessened resistance to cold, neuralgias, acroparesthesias, cramps, lancinating pains, lassitude, irritability, sadness.

4. *Giantism:* "Acromegaly in individuals in whom the epiphyseal cartilages are not yet ossified," impotence, amenorrhea, effeminacy, puerility, aboulia, asthenia, glycosuria, polyuria.

5. *Diabetes insipidus* (???):[57] Polyuria, polydipsia.

[55] Voir sur ce point les réserves de N. Pende, Patologia de l'apparecchio surrenale, Milan, 1909; de C. Frugoni. La gl. carotidienne possède-t-elle une sécrét. int. propre? Sem. méd., 9 oct., 1912, p. 481; de Lanzillotta, Archiv. de Fisiologia, 1 sept., 1913; et de Laignel-Lavastine, Pathologie du sympathetique (sous presse).

[56] Rénon et Delille, Congr. de méd., act., 1907, et Delille Thèse, 1909.

[57] Il tiendrait à un trouble du lobe intermédiare de l'hypophyse et de l'infundibulum. Harvey Cushing, The Pituitary Body and Its Disorders, Lippincott Co., Philadelphia et Londres, 1912; mais Camus et Roussy, Soc. de biol., 1914, passim, l'ont reproduit expérimentalement par lésions de la substance grise du tuber cinereum au voismage de l'infundibulum. Il desire chez le chien tout rôle à l'hypophyse dans la détermination du diabète insidipe, Presse méd., 8 juill., 1914, pp. 517–521.

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8. *Pineal*[58]

1. *Macrogenitosomatosis:*[59] Abnormal increase in growth or size, premature genital and sexual development with secondary sexual characteristics, hypertrichosis, precocious exaggerated mentality.

2. *Pineal adiposity:*[60] Diffuse obesity.

9. *Choroidal Plexus*

1. *Hydrocephalus:* Increased tension of the cerebro-spinal fluid, rapid reproduction, nervous and mental syndrome of ventricular hypertension, clouded mentality, idiocy.

10. *Ovaries*

1. *Infantilism:* Amenorrhea, absence of secondary feminine sexual characteristics, obesity, scanty hair, puerility.

2. *Acquired ovarian insufficiency:* Peripheral vaso-dilatation, crises of subjective sensations of heat, sweats, continuous or paroxysmal tachycardia, palpitations, increased arterial tension, insomnia, headaches, facial neuralgias, lumbago, neuro-muscular asthenia, uncertain memory, irritability, nervous debility, hysterical crises, exaggeration of the sexual instinct?, which is more often absent or inverted; obesity, inquietude, anxiety, phobias, impulses, gastro-spasm, constipation, vomiting, vertigoes, syncopes.

"Vagotonic crises," before the periods and at the beginning of pregnancy: pallor, tendency to syncope, spells of nausea, vomiting, constipation, lessened arterial tension, rather slow pulse, positive oculo-cardiac reflex, Samogyi's sign, psychic depression, related especially to the evolution of the corpus luteum.

One must not confound these premenstrual crises or crises of the beginning of pregnancy with the reactional dyshyperthyroidism of the menopause, characterized by hot flashes, sweats, hypertension, paroxysmal tachycardia, palpitations and anxiety.

3. *"Hyperovaria"* (Dalché):[61] Precocious puberty, abundant menses, pain during and before the first day of the periods, intermenstrual leucorrhea, developed sexual instinct, variability of de-

[58] Dana et Berkeley, W., Med. Record, 10 mai, 1913; L. J. Kidd, Review of Neurology and Psychiatry, janv.-fev., 1913, pp. 1-24 et 55-75.

[59] Ce syndrome de Pellizi, Ogle, Oestreich et Slavyk, Frankl-Hochwart, Gutzeit, Hudovernig, Raymond et Claude, Marburg, A. Collin et Heuyer, R. Neurol., 30 mai, 1914, p. 729, serait lié à la destruction de la pinéale par une tumeur chez les enfants. Au contraire, par Gallais, la pineale semblerait avoir une rôle fonctionnel analogue à celesi de la cortico-surrénale, loc. cit.

[60] L'ádiposité pinéale de Marburg serait liée à un "hyperpinéalisme"?

[61] Dalché, L'hyper. et l'hypovarie, Gaz. des hôp., nos. 75 et 78, 1906. Je préfère dire dyshyperovarie.

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sire depending on the menstrual period, well-developed eyebrows, thinness, pallor, large hips, rounded contour of the lower extremities, the size of which contrasts with that of the upper, lessened arterial pressure, uneasiness causing movement and action, nervous debility, tendency to loquacity, erotic crises.

11. *Testicles*

1. *Infantilism:* Lack of development in the male genital organs, absence of secondary sexual characteristics, obesity, little hair, increased length of the lower extremities, smallness of the cranium, puerility.

2. *Acquired testicular insufficiency:*[62] Increase in size, decreased hairiness, rotundity of the figure, tendency towards obesity, increased size of the breasts, loss of desire, impotency, senility, increased arterial tension?, asthenia.

The types of testicular insufficiency are, according to Rebattu and Gravier:[63]

1. The sterile.
2. Eunuchoid giantism, because the internal secretion of the testicle was of late appearance. One notes in such a case a prolonged infancy.
3. Eunuchism by castration, characterized by giantism and a youthful aspect. The secondary sexual characteristics do not appear.
4. Revertive infantilism of Gandy, or the known asexual sort of state, with attenuation of the secondary sexual characteristics and a certain degree of obesity, due to delayed testicular disorder in the adult.
5. Dyshyperdiastematosis: short lower extremities, large head, plenty of hair, especially heavy moustaches, thinness, persistence of youth, no arterial hypertension, activity, moral and physical energy.

12. *Prostate*

1. *Prostatic insufficiency:* Asthenia, diminished potency, neurasthenia, sometimes suicide.

[62] La gerodermie génito-dystrophique de Rumno et Ferrannivi serait au testicules ce que le myxoedème acquis est a la thyroïde.

[63] J. Rebattu et L. Gravier, Étude des troubles de la sécrétion interne du testicule. Dissociation des sécrét int. et ext. du testicule. Retard de l'établissement de la sécrét int. Nouv. Iconographie de la Salpêtrière, juill.–août., 1913, pp. 257–271.

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2. *Prostatic hypertrophy:*[64] Increased arterial tension,[65] slowing of the heart action, cerebral hemorrhage, genital excitement.

B. Polyendocrine Syndromes

(a) *With Predominance of the Thyroid*

1. Basedovians, with hypertrophy of the thymus and vagotonic symptoms; scleroderma and tetany, amenorrhea; Addison's syndrome; acromegaly, etc.

2. Myxedematous cases with hypertrophy of the thymus, tetany, acromegaly, Addison's syndrome, amenorrhea, infantilism, hypertrophy of the breasts, etc.

3. Acromegalics or ovarian insufficients with varied disorders either psychic, nervous, vaso-motor, or trophic, entering sometimes into the myxedematous series and sometimes into the Basedovian.

(b) *With Predominance of the Ovary*[66]

1. Thyroidal reaction to the ovarian insufficiency: tachycardia, palpitation, sweats, nervous irritability, vertigoes, scanty urination, tremors, anxiety, etc.

"One can no longer fail to notice," said I in 1908, "that the differences are very slight between these nervous manifestations and the picture of the attenuated forms of exophthalmic goiter. This pathogenetic idea allows of important therapeutic consequences. One can ask if it would not be of interest to institute an antibasedovian therapeusis, hemato-ethyroidin for instance, against the nervous and psychic disorders of the natural menopause, which recall trait for trait the symptoms of the Basedovian series."

Since then numerous successes of the sort have confirmed the justice of the idea.

2. Dyshyperovaria among cases of hypothyroidism:[67] anticipation, prolonged abundance of the menses, menorrhagia, metrorrhagia.

3. Thyro-ovarian disorders taken in the same sense: be it the ovarian insufficiency in the myxedematous series, or the dyshyperovaria in the Basedovian series, in all cases the nervous dis-

[64] Elle coïncide souvent avec l'insuffisance.

[65] L'extrait prostatique est hypotenseur et cardio-modérateur, Thaon. Soc. de biol., 13 juillet, 1907. Son injection est suivie de vaso-dilatation cérébrale. Ch. Dubois et L. Boulet, Soc. de biol., 19 avril, 1913, p. 811.

[66] Schickele, G., Kongress f. innere med., 1911.

[67] Leopold, Levi et H. de Rothschild, La petite insuffisience thyroïdienne, 1913, p. 153.

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orders, whatever they may be, of the dysthyroidal women are modified by the ovarian rhythm at all times

(*c*) *With Predominance of the Pituitary*

1. Infantile giants with their clinical varieties: feminism, eunuchism, crytorchidism, pseudo-hermaphrodism of the feminine type, mental puerility.

2. Acromegalics with deficiency syndromes, myxedema, infantilism, amenorrhea, obesity, asthenia.

3. Acromegalics, who on the contrary have syndromes of hyperactivity, more or less vitiated either of coöperation or supply: simple or exophthalmic goiter, arterial hypertension and atheroma, lacteal secretion.

(*d*) *With Predominance of the Suprarenals*

1. Addisonians with amenorrhea, impotence, chilliness, tetany or, on the contrary, exophthalmic goiter.

2. And very often Basedovians, acromegalics, giants, with spontaneous glycosuria of alimentary or adrenal type, this latter being able in certain cases to cause one to presuppose a certain degree of suprarenal activity.

(*e*) *Without Marked Predominance*

Take the case of Claude and Gougerot: loss of sexual characteristics, senile face, thick skin, wrinkles, pigmentations, chilliness, absence of perspiration, asthenia, lowered arterial tension, tetany, atrophy of the testicles, of the prostate, of the suprarenals, thyroid and possibly of the parathyroids.

In order to include these nervous disorders revealed in the endocrine syndromes in one complete aspect, I have grouped them together under five headings, motor, sensory, vegetative, and psychic disorders, to which I have added the results of the sympatho-vagotonic tests.

These are:

1. Motility (tonus, sthenic, reflex, voluntary);
2. Sensibility (special, general);
3. Vago-sympathetic:
   1. The sense of conscious existence (general, hunger, thirst, genital);
   2. Lisso-motility (pupil, vaso-motor, pilo-motor, chromato-

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motor, lisso-motor properly speaking, arterial tension);
3. Cardiac rhythm;
4. Digestive secretions (salivary, gastric, hepatic, pancreatic, intestinal), cutaneous (sweats), urinary (water, sugar); endocrinal.
5. Eutrophia. General good nutrition.

4. Psychism: rhythm, response, emotion, attention, memory, intelligence, activity, sleep, instinct (sexual).
5. Sympatho-vagotonic tests: adrenalin, atropine, eserine, pilocarpine, oculo-cardiac reflex.

Now, if I set aside the sympatho-vagotonic tests, then although it is very easy to answer plus or minus to different questions concerning the nervous state just analyzed, when one considers the thyroidal syndromes, it is impossible to do the same clearly for the other syndromes. Those which furnish most of the definite answers after the thyroidal syndromes are the ovarian syndromes. One single functional whole is affected by all, that is a sense of well-being (eutrophia); but I have indicated correctly that many of the disorders allied to endocrine dysfunction may be independent of the nervous system. Whence comes this first affirmation, that it is above all the thyroid syndromes and in the second place the ovarian syndromes that are most frequently accompanied by nervous disorders?

There is therefore an enormous difference between the endocrine glands viewed from the nervous consequences resulting from their disturbances.

Moreover the importance of the thyro-ovarian relations explains the differences according to sex of one portion of the neurology and especially of the psychiatry.

If, on the other hand, one classifies the divers groups of nervous disorders, psychic disorders appear to predominate in the thyroidal syndromes, the vago-sympathetic disorders in the thyroidal and ovarian syndromes, and finally the disorders of neuro-striated muscle motility predominate in the thyroidal, parathyroidal, thymic and suprarenal syndromes. Not only then are the endocrine syndromes far from being equal as regards wealth of nervous elements, but in addition they involve a relative election amidst these elements.

It remains to discover the reasons for these varieties of coincidence in delving further into the probable mechanism of their production.

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After this very summary account of the facts, let us consider their interpretation.

Among the nervous symptoms—motor, sensory, vaso-motor, secretory, trophic and psychic—revealed in the enumerated endocrine syndromes, all the world admits that there are some that are caused by endocrine disturbances; thus tachycardia and active vaso-dilatation are caused by thyroidal disorders in Basedow's syndrome, as are asthenia and lowered arterial tension by suprarenal disorders in Addison's syndrome. These glandular disorders themselves may be in their turn secondary to a nervous disturbance. I will bring to your notice such cases in the succeeding chapter. This is not really the question. The endocrino-nervous relationship is demonstrated: endocrinogenous nervous disorders do exist.

Such is my first conclusion, universally admitted. This does not mean to say that in other respects all the nervous symptoms existing in individuals afflicted with an endocrine syndrome are attached to this syndrome and dependent upon the glandular disturbance of which it is the expression. In addition, among the nervous disorders which depend upon the disturbance, one must differentiate two groups according as to whether they are related directly or only indirectly.

The direct endocrino-nervous relationships have numerous examples, both clinical and experimental: tachycardia in Basedovians, hypotension in Addisonians, mydriasis following the conjunctival instillation of adrenalin, etc.

The indirect endocrino-nervous relationships are often extremely difficult to outline precisely, and it is in their study that one part of the difficulties of the question lies.

I will also divide these relationships into four categories.

The first category includes the indirect endocrino-nervous relationships through evolutional morphological intervention. Thus a lesion of the thyroidal body sustained in early infancy, even in utero,[68] arrests the general development of the organism, and thereby interferes with the appearance of secondary sexual characteristics with all their consequences.

The glandular disorder, appearing in utero, in infancy or adolescence reacts on the development of the organism. The relationship comes essentially under the domain of ontogenesis and morphology. The secondary nervous disorders result from struc-

[68] J. Parhon, "Quelques considérations sur l'importance des fonctions endocrines, pendant la vie embryonnaire et foetale et sur leur rôle dans l'organogenèse," Presse med., 1er oct., 1913.

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tural anomalies, which are themselves secondary to the glandular lesion.

The second category, near neighbor to the first, includes indirect endocrino-nervous relationships through humoral morphological intervention. Thus normally the suppression of the ovarian function at the menopause entails well-known modifications of the female organism, the exaggeration of which determines, among other disorders, trophic symptoms such as a subcutaneous adiposity and development of hair. This example may also serve for the comprehension of a third category: the indirect endocrino-nervous relationships through a humoral intervention. The latter are extremely frequent; they are explained very naturally by the functional correlations under the influence sometimes of the hormones and sometimes, and perhaps more often, of the general modifications of metabolism (loss of calcium for example[69]) set free by the glandular disturbance or even directly by the cause of the latter.

For example increased arterial tension among Basedovians seems to be allied to the fact that their blood contains more adrenalin than that of normal individuals. Asher and de Rodt explain it by the fact that thyroidal hypersecretion reinforces the action of adrenalin; by an indirect route the terminal organs of the sympathetic may be in a state of excitation, and as the secretory nerves of the suprarenals belong to the sympathetic, an increased secretion of adrenalin may result.

Per contra, to explain the tachycardia, one must invoke another factor besides the experiments, experience teaches only that the products of *normal* thyroidal secretion augment the excitability of the autonomic nerves.

A fourth category is established by indirect endocrino-nervous relationships through nervous intervention. This intervention is excited at times physiologically and at other psychically. In the first case it consists for example of headache due to a meningo-encephalic vascular disturbance under the influence of a cervical sympathetic disorder of thyroidal origin.

In the second case it consists for example of a phobia (fear of dying, of having heart disease, of becoming insane, etc.) determined by a diffuse anxiety allied to a menopausal tachycardia from excitation of the sympathetic of thyroidal origin, and the accuracy of this mechanism is shown by the cure of such cases with hemato-ethyroidine (unpublished personal observations).

[69] Chiari et Fröhlich, Arch. f. exp. Pathol. u. Parmak., 1911, p. 214.

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One can consider this last group, which is very important in psychiatry, as a fifth category, and speak of indirect endocrino-nervous relationships, through psychic intervention. These relationships simply dogmatize the facts. They do not explain them. The Viennese school in a series of remarkable studies has attempted to interpret them. I will leave to my co-worker, Professor Biedl, the honor and pleasure of explaining these researches, which he partly instigated, and which he has had the wisdom to publish already with his collaborators and pupils, showing admirable command of the subject.

At the end of this analysis I will only remark that if the pharmacodynamic division of Langley, Eppinger and Hess of the vegetative system into the autonomic and sympathetic systems introduces in its own interest a new standard in the nomenclature of the nerves, up to now based on anatomy, and that if it is better now to think in terms of physiology rather than of anatomy, nevertheless the pharmacodynamic idea is not the whole of physiology, and the three present divisions of the vegetative system into the anatomical, physiological and pharmacodynamic do not fit their valencies together with any precision.

In a parallel manner to this division of the vegetative system Eppinger, Hess, Falta and Rudinger have divided the endocrine glands into two groups, one vagotrope and the other sympathicotrope. As I have already stated the vagotropes are the pancreas and parathyroids, and the sympathicotropes are the thyroid and the adrenals, to which Falta and Berterelli have added the infundibular portion of the pituitary. Now the analysis of nervous disorders in the endocrine syndromes shows moreover that the vagotonic and sympathicotonic disturbances, far from being always opposed to each other, exist at times in the same individual, not only consecutively but simultaneously, and accordingly there is not a simple and constant relationship between the endocrinal disturbance and the nervous disorder of one or the other group.

Things then seem much more complicated than one would have believed, and the classifications of the Viennese School, even if they have rendered, and still render, great service in arranging the phenomena, do not seem as yet sufficiently adequate in real truth to act as a basis for new systematizations.

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2. Endocrine Disorders in Nervous Syndromes

In all individuals suffering with nervous diseases endocrine disorders may coexist; but I will only outline the cases in which these endocrine disorders may be under the direct or indirect influence of the nervous syndromes, or which play a rôle in determining the nervous symptoms, although their clinical manifestations are not evident. Following this point of view I will divide these syndromes into three large groups: sensory-motor, vegetative and psychic.

A. Sensory-Motor Syndromes

Among these syndromes there are a great number that can have nothing but a relationship of casual coincidence or a more or less mediate attachment. That is why I eliminate the hemiplegias, paraplegias, ataxias, muscular atrophies, vertigoes, tremors, athetoses, choreas, spasms, myoclonias, contractures, convulsions, myotonias, hypotonias, myatonias, neuralgias, distributed pains, migraines, paresthesias by evident organic affections of the nervous system, with known lesions of the nerves, of the spinal cord or brain, even though endocrinogenous toxic functional nervous disorders often exist coincident with nervous symptoms of an organic nature. Certainly as bearing on the subject, for example, are the hemiplegias due to hemorrhage of the optic thalamus, often allied with suprarenal hypertrophies (Frouin), and which readily appear to be due to increased arterial tension secondary to dyshyperfunction of the adrenals; in like manner the cerebral hemorrhages of the menopause, allied also to ovarian insufficiency by the intervention of sudden hypertensive shocks in the vasomotor ataxia of that critical period; as well as, although inversely, increased suprarenal secretion by excitation of the splanchnic in the course of tabetic crises (there are endocrine secretory crises just as there are exocrine); also aspongiocytosis in these same suprarenals subsequent to the incessant motor agitation in cases of chronic chorea or mania (unpublished personal notes); also those tabetics or cases of syphilis of the nervous system with myxedema, infantilism, tetany, etc., caused by concomitant syphilitic lesions of the nervous system and the glands. In the first two cases the relationhip is too indirect and mechanical; in the two following the relationship is inverse, neurogenous, direct and indirect; in the last the coincidence arises from a co-effect of the same cause, namely syphilis, acting on two different parts of the body. One could multiply such examples without profit.

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I will retain among the sensory-motor syndromes only those whose pathology is still disputed, and which appear sufficiently often in coincidence with endocrine disorders for the hypothesis of a relationship between cause and effect to be at least worthy of discussion.

Such are

1. Certain intermittent paraplegias: thyroid, parathyroids, thymus, suprarenals.
2. Periodic paralysis (Westphal).
3. Pseudo-paralytic myasthenia gravis (Erb-Goldflam):[70] thymus, parathyroids.
4. Myopathies:[71] thyroid.
5. Certain vertigoes: pituitary, suprarenals, ovaries.
6. Certain tremors: thyroid.
7. Certain choreas: thyroid, suprarenals.
8. Certain spasms.
9. Certain myoclonias.
10. Tetany: parathyroids.
11. Parkinson's syndrome:[72] parathyroids, thyroid(?), pituitary(?), ovary(?).
12. Epilepsy: thyroid.
13. Eclampsia: parathyroids.
14. Myotonias.
15. Congenital myatonia.
16. Hypotonia.
17. Acroparesthesia.
18. The cephalalgias: thyroid, ovary.
19. Migraine: thyroid.
20. Certain paresthesias.

In this résumé I wish to state that the sensory-motor syndromes coming under the precise heading of the chapter: endocrine disorders in the nervous syndromes have not been described, so to speak, but I have nearly always indicated nervous syndromes in which endocrine disorders should be looked for in order to understand them. I have been guided therefore more by the relative symptomatic importance of the nervous and endocrine manifestations than by the causal relationship. From this last point of view

[70] Tobias, Neurol. Centralbl., May 1, 1913, pp. 551–62.
[71] Oppenheim, H., Congrès de Londres, 1913.
[72] Sainton et Barré, Soc. de Neurol., 26 juin, 1913. R. N., 15 juill., p. 55. Parhon et Goldstein, Soc. des sc. mèd., Bucarest, 1909, 1910; Encéph., oct., 1912, p. 228.

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I must distinguish at first the cases, few in number, where the endocrine symptoms are caused by nervous disorders, such as the endocrine insufficiencies described recently by Claude, in the train of the crises of Erb-Goldflam myasthenia, and later on the more numerous cases where the nervous symptoms are caused by endocrine disorders.

This subgroup is not to be confounded nevertheless with that of the nervous disorder in the endocrine syndromes, because in the latter there is a clearly outlined endocrine syndrome, while in the former there is merely an endocrine commotion. If they are confounded owing to their relationship of pathological causality, they are to be distinguished clinically in definite types, with, in addition, all their intermediates between them.

This having been stated, two remarks arise from the preceding résumé. It deals especially with syndromes having paroxysmal manifestations and with disorders bearing on qualitative variations of motility.

This rôle played by the endocrine glands in paroxysmal nervous manifestations did not escape a clever clinician like Léopold Lévi,[73] and he has proposed the name of endocrinolepsies for such paroxysmal syndromes, because they burst forth of a sudden, like an explosion (lepsy, λαμβανειν to seize) and they are subordinated to an endocrine disturbance.

The principal endocrinolepsies are, according to Léopold Lévi, ordinary migraine and ophthalmic migraine, ordinary asthma[74] and nasal asthma, muco-membranous enteritis, urticaria, relapsing edemas, periodic hydarthrosis, acute exacerbations in chronic rheumatism, paroxysms of gout, crises of grayness of the hair, crises of anxiety, acute paroxysmal goiter.

I feel that I can add certain convulsive, tetanic, paralytic and asthenic crises.

These crises, sudden, variable, relapsing, subject to disappearance through the use of simple organotherapy (most often thyroidal, sometimes adrenal) or complex, are as a rule dominated by the feminine sexual life.

According to Léopold Lévi the endocrine disorder is the pathological mordant which sensitizes centers already predisposed. In

[73] Léopold Lévi, Endocrinolepsies, leurs charactèrs généraux, Soc. de méd. de Paris, 9 janv., 1914, pp. 44–47.

[74] La crise hémoclassique initiale découverte par Widal et ses collaborateurs dans l'asthme, Rev. méd., juill., 1914, comme dans l'urticaire et l'hémoglobinurie paroxystique, Sem. méd., 1913, n'élimine pas le facteur nerveux réactionnel et ses connexions endocaines.

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thyroidal endocrinolepsies, he claims a hyperthyroidal paroxysm which activates the nervous centers by a local vaso-motor blast. I might state with equal reason that it is a general law of the nervous system to respond in intermittent fashion to continuous stimulation.

Be that as it may I have continued to insist on the paroxysmal character of sensory-motor syndromes, such as tetany, myasthenia, migraine, which seem allied with endocrinal disturbances.

Secondarily I recall that the schema of Lundborg,[75] open to discussion from certain viewpoints, has the merit of synthesizing the physio-pathology of the thyroid and parathyroids and of showing the rôle played by the parathyroids in the neuro-muscular regulation. It is in this way that he connects tetany, paralysis agitans, myoclonia (myoclonus, epilepsy), myotonia, with a parathyroid insufficiency, and pseudo-paralytic myasthenia and periodic myatonia with a hyper or dysfunction of the parathyroids.

Tetany is alone to-day no longer in doubt, as far as the other affections are concerned—it is nothing but an hypothesis as yet. The most firmly established hypothesis appears in relation to Parkinson's syndrome. In this instance as Roussy and Clunet[76] state the parathyroids may be found in a condition of hyperplasia. As to the relation of this condition with the syndrome, it is ignored. It is quite possible, according to Claude,[77] that it consists of a simple reaction of defense in the organism.

B. Vegetative Syndromes

In this enumeration I will follow the plan of my Pathology of the Sympathetic[78] now being published.

(*a*) *Tegumentary Syndromes*

1. Local syncope of the extremities: thyroid, suprarenals, kidney.
2. Acrocyanosis: thyroid, thymus.
3. Erythromelalgia: ovaries, thyroid, suprarenals.[79]
4. Acroparesthesia: suprarenal.
5. Erythema: thyroid.
6. Urticaria: thyroid.[80]

[75] Lundborg, Deutsche Zeitschr. f. Nervenheilk., Bd. XXVII, 1904, p. 217.
[76] Roussy et Clunet, Arch. de méd. exp., 1910, no. 3.
[77] H. Claude, Soc. de Neurol., fev., 1910.
[78] M. Laignel-Lavastine, Pathologie du Sympathique. Esquisse d'anatomo-physio-pathologie clinique, 1 vol. in-8 de 600 p., Paris, Alcan, 1915?
[79] Moleen, G., Journ. Amer. Med. Ass., 17 août, 1912.
[80] Les modifications sanguines qui précèdent la crise d'urticaire, ses rapports avec l'anaphylaxie, sa cause determinante ramenée par Widal et ses

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7. Dermographia: thyroid.
8. Purpura: liver.
9. Pruritus: liver, kidney, thyroid.
10. Melanoderma: suprarenal, thyroid.
11. Vitiligo.
12. Hyperidrosis: ovaries.
13. Chromidrosis.
14. Seborrhea: thyroid(?), testicles(?), ovaries(?).
15. Goose flesh: thyroid(?).
16. Premature grayness of the hair: thyroid.
17. Alopecia: thyroid.[81]
18. Hypertrichosis: thyroid, suprarenals, testicles, ovaries.
19. Zona and herpes.
20. Scleroderma: thyroid.
21. Raynaud's gangrene: thyroid(?).
22. Acute angioneurotic edema: thyroid.
23. Trophedema: thyroid(?), pituitary(?).
24. Adiposity: pituitary, thyroid, ovary, pineal.

(*b*) *Osteo-articular Syndromes*

26. Acromegalia: pituitary.

(*c*) *Syndromes of the Neuraxis*

29. Syndromes of the cervical sympathetic: thyroid(?), suprarenal.
31. Mydriasis: thyroid.
32. Myosis: suprarenal(?).
33. Glaucoma.
34. Glittering eye: thyroid.
35. Exophthalmos: thyroid.
36. Migraine: thyroid, ovaries.
37. Cephalic vaso-dilatation: ovaries(?).
38. Epilepsy: thyroid, ovaries.
39. Vertigoes: suprarenals, ovaries, thyroid.
40. Euphoria: thyroid.
41. Melancholia: thyroid, suprarenals, ovaries.
42. Anxiety: thyroid, ovaries.

élèves (Widal, Abrami et Et. Brissaud: L'auto-anaphylaxie, Sem. méd., 24 dec., 1913), à un conflit entre colloïdes, n'excluent pas l'importance de la thyroïde dans les prédispositions réactionnelles et les manifestions neuro-cutanées.

[81] Sabourand, Ann. de dermatol., mars, 1913.

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(*d*) *Circulatory Syndromes*

43. Vascular spasms: suprarenals.
44. Increased arterial tension: suprarenals, pituitary.
45. Vaso-dilatations: thyroid, ovaries.
46. Arterial hypotension: suprarenals, pituitary.
47. Palpitations: ovaries, testicles, thyroid.
48. Tachycardia:[82] thyroid, ovaries.
49. Bradycardia: pituitary(?).
50. Arrhythmia.
51. Cardiac neuralgias.
52. Syncope: thymus, suprarenals.

(*e*) *Respiratory Syndromes*

54. Asthma: thyroid.
56. Acute edema of the lungs: suprarenals.
57. Rhinorrhea.

(*f*) *Digestive Syndromes*

58. Hypersalivation.
60. Gastric crises.
61. Enteralgic crises; thyroid.
65. Digestive atony.
66. Digestive spasms.
71. Diarrhea.
72. Glycosuria: thyroid, suprarenals, pancreas, liver, pituitary.
78. Constipation: thyroid, pituitary.
80. Muco-membranous entero-colitis: thyroid.

(*g*) *Urinary Syndromes*

84. Polyuria: pituitary(?).
85. Albuminuria.
89. Too frequent urination: thyroid.

(*h*) *Genital Syndromes*

95. Impotency: prostate, testicles.
96. Priapism: suprarenals.
98. Ovarian crises.
101. Frigidity.
104. Menstrual troubles: thyroid, ovaries.

[82] La théorie endocrine de la tachycardie paroxystique a été exposée par Savini (Arch. des mal. du coeur, nov.-dec., 1912). J'en ai confirmé l'au dernier l'exactitude chez une femme à la ménopause qui quérit par opothérapie ovarienne.

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(*i*) *Endocrine Syndromes*

105. Basedow's syndrome: thyroid, thymus.
106. Addison's syndrome: suprarenals.
107. Polyendocrine sympathetic syndromes.

(*j*) *General Trophic Syndromes*

108. Hyperthermia: thyroid.
109. Hypothermia: thyroid.
111. Diabetes mellitus: pancreas, suprarenals.
112. Emaciation: ovaries, testicles, thyroid.
113. Obesity: thyroid, pituitary, pineal, ovaries, testicles.
114. Herpetism: thyroid.

All these vegetative nervous syndromes are the functional results of very different causes. Such glands as I have marked opposite to them simply indicate that in certain cases the endocrine disorders, which have been noted in coincidence with the nervous disorders, have played a rôle in the determination of these nervous syndromes, or that inversely the endocrine disorders are secondary to the nervous commotions.

In fact it is often very difficult clinically to keep from confusing the angio-tropho-neuroses and their endocrinal consequences with the endocrinopathies and their vegetative nervous consequences.

Quite often the symptomatic intricacy and the paucity of chronological and established data are such that one is forced to have recourse to a synthetic expression, such as sympathosis,[83] which I have proposed, and which simply indicates a vegetative nervous syndrome. Among the univocal sympathoses, the sensory, circulatory, lisso-motor, secretory and trophic sympathoses constitute the framework for the preceding facts. I must call attention to the considerable rôle that these vegetative nervous syndromes play in dermatology in their vaso-motor, secretory and trophic types and in psychiatry in their cenesthetic and vaso-motor types.

It is here that one grasps the closeness of the connections between the internal secretions and the vegetative nervous system, and one understands thereafter the interest of the study of the sympathetic and the vascular glands in domains like dermatology and psychiatry,[84] where taken clinically they still conform partly to a botanical classification.

[83] Laignel-Lavastine, Les sympathoses, Presse méd., sept. 20, 1913.

[84] Laignel-Lavastine, Le sympathique et les viscères dans les affections mentales, Traité internat. de Psychol.-pathol. Dans ce travail je montrais l'importance de ce que Münzer nomme très hereusement "la décentralization de la psychiatrie."

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Just as I have laid stress elsewhere[85] on the rôle of the sympathetic in that which I have called the pathology of the border made up of those humoral reactions or reflexes saddled on neurology, dermatology, psychiatry, visceral medicine and the pathology of metabolism, one can claim that there is a whole endocrino-vegetative chapter still to be written in dermatology, as in digestive, circulatory, respiratory, urinary and mental pathology.

C. Pyschic Syndromes

My report[86] in 1908 at the Congress of Dijon on psychic disorders due to disturbances of the glands of internal secretion, the excellent report of Professor Parhon[87] at the Congress of Gand in 1913 on the glands of internal secretion in their relationship to psychology and mental pathology and the recent article of M. Van der Scheer[88] have outlined and brought out the question.

In order to avoid criticism I refer to their works and enumerate the results which are the least doubtful.

(*a*) *Syndromes of Cerebral Debility*

1. Anencephalia: suprarenals.
2. Idiocy and cranial malformations:[89] thyroid, parathyroids, suprarenals.[90]
3. Imbecility.
4. Backwardness:[91] thyroid, pituitary, ovaries, testicles, thymus.
5. Mental debility.
6. Psychic imbalance.[92]

(*b*) *Syndromes of Delirium*

7. Mania:[93] thyroid, suprarenals, ovaries.
8. Melancholia: thyroid, ovaries, liver, suprarenals, kidneys, pituitary.

[85] Laignel-Lavastine, Définition du sympathique, Gaz de Hôp., 1912.
[86] Laignel-Lavastine, Congrès des aliénistes et neurologistes, Dijon, 1908.
[87] C. I. Parhon, III^e Congrès internat. de Neurol. et de Psychiatrie, Gand, 1913.
[88] W. M. Van der Scheer (de Meerenberg), Die pathogenetische, Stellung der Blutdrusen in der Psychiatrie, Jahresversammlung der Nederlansche Vereeniging voor Psychiatrie en Neurol., 3 juill., 1913.
[89] Bertolotti, Presse méd., 2 mai, 1914, p. 334.
[90] Guilorowsky, Influence d'hypoplasie surr. sur ce cas d'idiotie, Congr. assist. des aliénés, Moscow, janv., 1914, Arch. de Neurol., mars, 1914, p. 163.
[91] Hastings-Gilford, Influence des glands a secret. int. sur le developp., Congr. internat. de Londres, 1913, sect. de Psychiatrie, rapp.
[92] Cot. Ch. et Dupin, Insuff. glandul. et anormaux, Enceph., mars, 1913, pp. 223–34.
[93] Lafora, G. R., Folie manique depressive et hyperthyroidisme, Revista clin. de Madrid, 15 oct., 1913, pp. 294–301.

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9. Mental confusions: liver, kidneys, thyroid, parathyroids, pancreas, pituitary, suprarenals, ovaries, testicles.
10. Systematized hallucinatory deliria.
11. Systematized deliria without hallucinations.
12. Genital perversions: ovaries, testicles, prostate, suprarenals.

(*c*) *Syndromes of Dementia*

13. General paralysis: suprarenals, thyroid, pituitary, etc.
14. Dementia præcox:[94] testicles, ovaries, pituitary.
15. Cerebro-arteriosclerosis: suprarenals, testicles.
16. Senile dementia: parathyroids, thyroid, testicles, ovaries.
17. Epileptic dementia.

(*d*) *Neuro-psychic Syndromes*

18. Epilepsy: thyroid, parathyroids, testicles, ovaries.
19. Nervosism: thyroid.
20. Hysteria: thyroid, ovaries.
21. Neurasthenia: suprarenals, testicles, ovaries.
22. Psychasthenia: thyroid, ovaries, testicles, suprarenals.

This analysis of endocrine disorders investigated, discovered or supposed, in the psychic syndromes allows in the first place the conclusion that just as psychic symptoms are met with frequently in endocrine syndromes, so are endocrine disturbances indicated very often in the psychic syndromes. Moreover one should state that the value of the indicated endocrine disorders is very uncertain, and the confirmation of a clinical endocrine sign or glandular test is vastly more important than an organotherapeutic result and above all more important than the existence of endocrine lesions, because we know the utter banality of all these.

The frequency of pathological endocrino-psychic associations are not explicable alone by fortuitous coincidences and more or less mediate attachments. It seems to me necessary to admit, in certain cases at least, a relationship of casuality. This conclusion which I advanced in 1908 has been confirmed by numerous authors, and recently by M. Parhon in 1913. This relationship of casuality varies moreover according to the case. Eliminating fortuitous coincidence I will sum up in a few lines my ideas on the more or less mediate bonds between endocrine and psychic disorders, on the causal rôle played by the psychic syndromes in endocrine disorders

[94] Dercum et Ellis, J. of Nerv. and Mental Disease, fev., 1913, pp. 73–90.

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and on the causal rôle played by the endocrine disorders in the psychic syndromes.

1. Relationships of Connection between Endocrine and Psychic Disorders

In this heterogeneous group I place the cases in which the frequency of association between endocrine and psychic disorders makes one think that it consists of something more than a coincidence, and in which nevertheless one can not demonstrate a clear relationship of casuality.

Thus psychic excitations give rise to fits of rage or anxiety. In a similar way to psychic changes, modifications of endocrine secretion, thyroidal for example, appear to me to be among the factors that make up that physio-psychic complex called emotion. Some think that the psychic factor is causal, others like Redmond and Sauvage[95] think that "the phenomenon of emotion is the result of auto-intoxication, due to a sharp destruction of endocrine equilibrium." I consider that the mechanism is a triple one: at times the psychic act releases the secretory act, at others the endocrine act releases the psychic act, and at still others the endocrine and psychic action are both the coresults of the same cause. It consists of a proximate adherence.

Take for another example a given case of juvenile general paralysis with infantilism. The meningo-encephalitis like the atrophic thyroidal sclerosis, being the results of hereditary syphilis, are both coeffects of the same cause. The two syndromes, psychic and endocrinal, are therefore bonded by a relationship of mediate adherence.

2. Causal Rôle of the Psychic Syndromes on the Endocrinal Disturbances

In the normal state one can not deny that psychic excitations determine disorders of secretion. The experiences of Dumas and Malloizel and the results of Cannon, where emotion has increased the quantity of adrenalin in the blood, like the classic case of Trousseau of exophthalmic goiter caused by a fit of rage, are instances of the kind.

In the pathological state the results are the same: motor agitation caused by delirium may bring about almost complete aspongiocytosis of the suprarenals, as I have had occasion to observe in the insane. It is therefore plain to me that the psychic factor may

[95] Redmond and Sauvage, Soc. de psychiatrie, 10 fev., 1913.

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bring about the endocrinal result. Moreover the psychogenic mechanism of endocrinal disorders is not uniform, and if in certain cases it is directly psycho-secretory, it is much more frequently indirectly psycho-physio-secretory, the intermediary perhaps being the physico-chemical modifications of divers viscera of life of relationship or of nutrition.

3. Causal Rôle of Endocrinal Disorders on the Psychic Syndromes

This rôle, by far the most important, is not always uniform. One can differentiate three large divisions as I have already shown in 1908.

1. Sometimes the endocrinal disorder arising in utero, in infancy or adolescence reacts on the development of the organism and the brain: the psychic disorders result from anomalies of structure.

2. At others the endocrine disorder, compatible with existence and a relative functionating of the organism, brings about in organic as well as psychic life more or less reciprocal modifications of various modalities.

3. At still others the endocrine disorder no longer moderate but massive produces, along with grave disorders of the organism, intense cerebral reactions, which reveal themselves always in the same way by classical toxic psychoses of the mental confusion type.

These three divisions seem to me to explain the facts of the third group with sufficient connection.

1. The first is the most simple. It remains essentially in the domain of ontogenesis and morphology. The mental puerility of infantilism is an example.

2. The second is on the humoral order. The internal organs being specifically modified by the elective disturbance of one or many of the selected internal secretions, the anatomical elements which they bathe are by such modified in their vitality. There result accordingly pathological changes along with somatic, anatomic and functional alterations. The former like the latter, reflexes of a like humoral disorder, present a debased series of a frank pathology or normal model.

With greater precision, one can differentiate with Parhon three varieties in the humoral action of the endocrine glands on the psyche.

In the first place these glands directly influence the nervous

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system itself, and one can distinguish, with Munzer, sympathicotonic, vagotonic (or better autonomotonic) and polytonic glands, these last being able to affect, for example, the cerebral cortex, the autonomic system and the sympathetic. The tonicity of one or many cortical centers being influenced, their psychic function will thus remain the same. However, this psychic function will respond equally to changes in the cerebral circulation, the state of the respiration, the oxidation of the body, and the chemical composition of the blood—for example the richness or poverty in calcium salts, etc. Now one or the other of these influences, if not all, are affected by the sympathicotonic or autonomotonic action of the endocrine glands.

Side by side with this action, more or less directly central, Parhon claims a peripheral action "which moreover may be itself partly the consequence of a central action"; it is the action of the endocrine glands on the sense of conscious existence.

He adds that "the action of the genital glands must acknowledge partly at least a similar mechanism." Finally the endocrine glands. by their action on the general metabolism, bring about modifications of different tissues, which affect the psyche through humoral, nervous reflex or psycho-cenesthetic means.

3. "Finally, I claimed, the third mode of action, the massive, of the endocrine disorders on the mental life, which is characterized by toxic psychoses, is often very complex in the sense that the cerebral intoxication is not only the result of the disturbance of the incriminated gland, caused by the concomitant syndrome, but the result of a series of associated or secondary functional insufficiencies. It is thus that in cases of Addison's disease with delirium the discovery of azotemia by Sicard and Haguenau[96] might give rise to the hypothesis that renal insufficiency may have been added to the suprarenal insufficiency in the mechanism of delirium, but the statement must be made that the determination of azotemia has no interest unless such is not terminal, because of its known frequency immediately before death.[97]

In a word the endocrine disorders in nervous syndromes, whether they have been established by clinical or anatomical methods or induced by physiological or therapeutic proofs, are face to face with the nervous syndromes.

1. It may be a relationship of simple fortuitous coincidence.

2. It may be a relationship of more or less mediate adherence.

[96] Sicard et Haguenau, Soc. méd des Hôp., 15 mai, 1914, p. 902.
[97] D. Dumitresco et A. Popesco, Presse méd., 27 juin, 1914, p. 487.

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3. It may be a relationship of causality: at times the nervous disorder has determined the endocrine disturbance, at others and inversely it is an endocrine disturbance which has determined the nervous syndrome, but the frequent clinical latency of the former may interfere with the comprehension of the cause of the latter.

It is necessary to remember that to a patent nervous disorder there is frequently attached a latent endocrine cause. One should therefore look for an endocrine cause in any nervous syndrome of an unknown or obscure origin. But one must not be determined to find such in spite of everything, and to accept contingencies for necessities.

In conclusion, all the facts gone over in this critical review are explained aside from coincidence and coeffects of the same cause, at times by a direct or indirect endocrino-nervous relationship through a morphological intermediary (evolutional or humoral) or a physiological intermediary (humoral or nervous) or a psychic intermediary, at others by a direct or indirect neuro-endocrinal relationship through a direct morpho-evolutional, physiologic reflex or psychic intermediary or through the same indirectly (motor activity, general nutrition), and at still others by recurring endocrino-neuro-endocrinal relationships and neuro-endocrino-psychic relationships.

This is explained in the following table.

ENDOCRINO-NERVOUS RELATIONSHIPS

A. Coincidence.

B. Connection. { Proximate. / Mediate.

C. Causality.

1. Simple...
- 1°. Endocrino-nervous.
  - (1) Direct.
  - (2) Indirect through intermediaries. { Morphologic evolutional. / Morphologic humoral. / Physiologic humoral. / Physiologic nervous. / Psychological.
- 2°. Neuro-endocrinal.
  - (1) Direct.
  - (2) Indirect through intermediaries. { Morphologic evolutional. / Physiologic reflex. / Psychologic. / Motor activity. / General nutrition.

2. Double... { 3°. Endocrino-neuro-endocrinal. / 4°. Neuro-endocrino-nervous.

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B. Endocrino-Neurological Sketch

In practice, that which matters is less the neurogenous endocrine disorders than the endocrinogenous nervous disorders.

Of course the endocrine disorders secondary to the nervous disorders are very interesting theoretically and practically. Theoretically they show the unity of human personality and not only the influence of nervous disorders on the secretions and nutrition, but in addition, to use an old expression which illustrates the picture, the mastery of the soul over the body.

Practically their interest is twofold, because attenuated and masked by the nervous syndrome, they may nevertheless modify and complicate it, as can be seen in certain tabetics and general paralytics. Inversely when very marked they may mask more or less through their symptomatic richness the clinical expression of the nervous disorders which cause them, and thus effect a change with an endocrine syndrome which is clinically primitive. This is the case in certain Addisonian and Basedovian syndromes, which are not originally endocrinogenous but neurogenous.

Endocrinogenous nervous disorders, which are infinitely more frequent than neurogenous endocrinal syndromes, form altogether an extremely important group, which, unburdened with morphologic and endocrinogenous trophic syndromes in which a nervous factor is not constant, constitute the greater part of functional neurology.

I intend in this sketch, as a practitioner, to limit myself almost entirely to that which functional neurology owes to endocrinology.

I will take my illustrations from certain ordinary symptoms, endocrino-vegetative syndromes, traditional psychoneuroses, temperaments and characters.

1. Ordinary Symptoms

Among the ordinary symptoms I retain arbitrarily asthenia, headache, insomnia, anxiety, sweats, constipation, arterial hypertension and obesity in order to show that there are for each of these symptoms certain cases which arise from an endocrinal cause, and that daily one should give an endocrine factor consideration in pathogenic diagnosis. It should be considered but not determined upon except on the authentication of well-marked signs, that is to say, clean cut and frank. Moreover most frequently such consideration ends in elimination.

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(1) Asthenia

Asthenia is abnormal fatigue. It is either general or more especially motor or psychic.

Motor asthenia is an extremely commonplace symptom, due to various causes, either infectious, toxic or psychic.

Among the motor asthenias of endocrinal origin, the first to be recognized was the asthenia of Addison's disease. It is connected with adrenal insufficiency, and is accompanied by arterial hypotension.

In addition there are motor asthenias allied with adrenal insufficiency, which are not Addisonian. This fact is well known to-day. They are very common and are usually but not always accompanied by arterial hypotension.

Their recognition and consequently their organotherapeutic treatment will permit the cure of a large number of sick, ticketed as neurasthenics, cyclothymics, melancholics and even hypochondriacs. Certain cases of arteriosclerosis with hypotension enter into this category. The interesting point is that they were often asthenics already at the beginning of their arteriosclerosis, while they still had hypertension. This asthenia of hypertensive arteriosclerotics existing from the beginning is well understood to-day. Maurice de Fleury among the first has shown its frequency. In such cases there is often a dyshyperfunctionating of the suprarenals. This asthenia of hypertension through dyshyperfunction may be recovered from completely through a simple regime. It can after a period of years border on asthenia due to adrenal insufficiency, an insufficiency itself secondary to the old glandular hyperfunction and without mechanical participation of cardiac insufficiency; I have followed a lot of such cases in the last ten years.

The majority of endocrinogenous muscular asthenias are suprarenal, but there are others which are thyroidal, thymic, parathyroidal, pituitary, ovarian, testicular and polyglandular.

Dejerine and Gauckler[98] have brought the weight of their authority to the support of these data.

The endocrinal origin of a muscular asthenia having been recognized, diagnosis is not complete. The cause must be determined. In the simple cases it is sometimes an infection (a beginning tuberculosis, convalescence from grip or diphtheria, etc.), at others an intoxication. In the more complicated cases it is a vascular, nervous or psychic disturbance, under the subjection itself of a previous endo-

[98] Dejerine et Gauckler, Les asthénies périodiques crises de fatigue. Presse méd., 17 juin, 1914, pp. 457–459.

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crinal disorder. It is often like this in the hypophysics of Martinet,[99] a typical case of which I have actually seen, which merits publication by itself.

An important fact is that the asthenia may be not the result but the cause of an endocrinal insufficiency. Claude[100] believes this to be the case in the paralytic myasthenia of Erb-Goldflam. According to him the endocrine glands are normal or rather increased in size, but they are exhausted by an effort truly excessive. This is brought about by the entrance into the circulation of poisons to the nerve and muscle cells of inconstant origin, but which, in certain cases, arise from a disordered thymus. In the Erb-Goldflam syndrome the multiple insufficiency of the endocrine glands by functional exhaustion is therefore secondary, just as the disappearance of spongiocytes in the suprarenal cortex is secondary to an intense or prolonged muscular agitation. I have had occasion to confirm in eight cases this fact grasped experimentally by Mulon[101] and clinically by Porak.[102]

(2) Headache

Not only migraine,[103] but the most ordinary headache may be of endocrinal origin. Many of the headaches called neurasthenic come under this heading. The most frequent of the endocrinogenous headaches are those of thyroidal[104] origin. As a general thing slight concomitant signs of hypothyroidism, such as palpebral edemas, anorexia, constipation, somnolence, chilliness, muscular and articular pains assist the diagnosis; but sometimes the thyroidal disorder does not reveal itself except by the headache, which of itself and through causal elimination should possess an indicative value. These headaches are very frequent among women; are more or less governed by genital life, improved by sexual relations[105] and cured by pregnancy. I have gathered typical cases of the kind in my practice.

[99] Martinet, Syndrome hyposphyxique, Pr. méd., 21 déc., 1912. S. hyposphyxie et insuff. plurigland., Ac. de méd., 22 avril, 1913, et Pr. méd., 2 août, 1913.

[100] H. Claude, La myasthénie paralytique et les syndromes asthéniques par insuffisance surrénal, Acad. de méd., 9 juin, 1914, et Soc. de Neurol., 28 mai, 1914. R. N., 15 juin, p. 786.

[101] Mulon, P., Soc. de biol., 26 juill., 1913, p. 189.

[102] Porak, Mém. inéd.

[103] Léopold Lévi et H. de Rothschild, Acad. de méd., 14 nov., 1911, p. 22; Répertoire de méd. int., mars, 1912; Goett, La migraine thyroïdienne. Th. Bordeaux, 1909. Flatau, La migraine, Berlin, 1912; A Véron, id., Th. Lyon, 1914.

[104] Gaujoux, Céphalée hypothyroïdienne et opothérapie, Soc. des Sc. méd. de Montpellier, 14 mars, 1913; Bilancioni, G., Il Policlinico, sez. pratica, 23 mars, 1913, pp. 401–6.

[105] Migraines de jeunes filles guéries par le mariage, migraines de jeunes femmes absentes le lendemain de l'accomplissement des devoirs conjugaux.

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After the thyroidal types, the ovarian, testicular, pituitary, suprarenal and polyendocrinal headaches are to be noted.

(3) Insomnia[106]

Among the insomnias those of Basedow's syndrome and the menopause, which come under the heading of dyshyperthyroidism, show the existence of endocrinogenous insomnias.

The most frequent of these is the dyshyperthyroidal, seen clearly in the cases that I have just cited. It is probably present in many of the psychoses, where one knows that thyroidal excitation is frequent. It is to be suspected at least in the "nervous" where no other appreciable cause justifies its presence.

The insomnia of acquired ovarian insufficiency seems to contradict this precedent.

Perhaps it conforms to the same lines as the insomnia of certain cases of hypertension of the fifties, where the genital functions are lessened.

(4) Anxiety

The anxiety of Basedovians and of many women at the menopause and its cure by hematothyroidin, confirmed many times by Alquier, Rose, myself and many others, show the existence of endocrinogenous anxiety due to dyshyperthyroidism. This anxiety seems really to be that of the anxious melancholias. It is already known that the works of Parhon tend to show the rôle played by the thyroid in what he calls the affective psychoses.[107]

The anxiety frequently noted in acquired ovarian insufficiency seems to be controlled by the same mechanism.

Clinically considered, all anxiety that does not possess warrant should make one suspicious of an abnormal excitation of the thyroid.

(5) Sweats

A vagotonic reaction, released by pilocarpine, arrested by atropine, the sweats which come on in crises at the menopause, are associated in the hot flushes with active vaso-dilatation, but may be present alone. Symptomatic in this instance altogether of acquired ovarian insufficiency and of thyroidal reaction, they are seen in the two conditions. We are all familiar with the frequent sweats of Basedovians.

[106] A. Salmon, La fonct. du sommeil, Vigot, 1910.

[107] Cette voie permettra peut être de trouver des raisons aux intermittences de toutes des syndromes d'excitation et de dépression, maniaques et mélancholiques.

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According to this there are endocrinogenous sweats due to dyshyperthyroidism. This vagotonic expression referable to thyroidal excitation is associated very often with sympathicotonic manifestations of a similar origin. It is thus in the classical hot flushes of the menopause.

(6) Constipation

Spastic constipation, "vagotonic," which yields to belladonna, is a nervous symptom.

Its recognition in cases of hyperchlorhydria, in certain neurasthenics, in women at the menopause or at the beginning of pregnancy, permits of cures as easy and complete as they are brilliant, through the use of the well-known belladonna pillule of Trousseau and Pidoux.

Then again it is frequently caused by ovarian or testicular insufficiency with abnormal excitation of the thyroid, as seen in the observations of Marañon.[108]

This constipation must be carefully distinguished from the constipation of myxedema, from the general type of constipation, such a common sign of hypothyroidism, and which is cured by organotherapy.

Thus the same symptom in its gross clinical expression may be of thyroidal origin, and point nevertheless to two different mechanisms, excitation or insufficiency of thyroidal secretion. This instance of thyroidal constipations is not the only example of endocrinogenous constipations that can be given. There appears to be one also of pituitary origin, although the cure of certain atonic constipations by the extracts of the posterior lobe of the pituitary does not demonstrate the nature of this, inasmuch as these extracts act as excitants of unstriped muscle tissue by virtue of their pharmaco-dynamic properties, and not on account of their elective vicarious or stimulating[109] action on the pituitary.

(7) Arterial Hypertension

To Vasquez belongs the credit for having described in man "arterial hypertension due to hypersecretion of the suprarenals," which Josué confirmed by experiments. In advance of this permanent hypertension, hyperadrenal secretion may show itself through hypertensive crises, which have been classical since the time of Pal. Moreover, there are other hypertensive crises besides the endocrinogenous,

[108] Marañon, G., Hyperchlorhydrie et hyperthyroïdism, Revue de méd., 10 mars, 1914, pp. 161–83.
[109] Hallion, loc. cit.

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and among the latter others besides those due to hyperadrenal secretion. Those which are allied with disturbances of the pituitary, ovary, testicles, prostate, thyroid and parathyroids, have been recognized. In like manner there are permanent arterial hypertensions which are not endocrinogenous, and among the latter some which are not of suprarenal origin.

There is no need to continue. I have simply tried to show that there are arterial hypertensions which are nervous endocrinal syndromes, because they depend upon a vascular spasm, of endocrinal origin.

(8) Obesity

The existence of endocrinogenic obesities is no longer a matter of dispute. Mouriquand[110] has described them well recently in children.

I have reported several cases myself this last year.[111]

The only point of interest is the demonstration of a nervous factor in the determination of these endocrinogenic obesities. In the majority of cases I do not think that this exists, but believe that such obesities arise through humoral disturbance of endocrinal origin. Nevertheless a nervous factor is present in the cases noted where a cerebral tumor gives rise to obesity through pressure on the pituitary. One might also suspect, if not prove, a nervous factor in those cases of segmentary[112] or paraplegic disposition of adipose tissue. I have with Viard reported a case of this type, which corresponding to a trophedema of Henry Meige, studied previously with M. Sicard,[113] caused me to view in their entirety "the variations of the panniculus adiposis, according to the divers physiological conditions—of infancy, puberty, pregnancy, lactation, castration, and of the menopause—and to pathological conditions—of the simple or associated endocrinal syndromes, thyroidal, pituitary, ovarian, testicular, suprarenal, and parathyroidal—pursuant to their relations with the trophedema of Henry Meige, the adiposis dolorosa of Dercum, the intermediate affections between these two syndromes, to

[110] Mouriquand, Congres de Pédiatrie, Rapp., 1913.

[111] Laignel-Lavastine et L. Boudon, Obésité par sarcome juxta-hypophysaire. Soc. méd. des hôp., 13 fev., 1914; Laignel-Lavastine et Pitulesco, Obésité familaile avec perturbations endocrines, *id.*

[112] Sicard et Berkowitsch, Adipose doul. par insuff. ovarienne, Gaz. des Hôp., 1908, p. 848; Claude et Sézary, Adip. doul aet remarquable de l'opoth. Thyr., Gaz. des Hôp., 1913, No. 86, p. 69; Ivanoff, Mal de Dercum, R. russe de Psychiatrie, mars, 1913; Weber, Parks, Lipodystrophie progressive; R. Hirschfeld, in Handbuch der Neuro. de Lewandowsky, Bd. IV, pp. 455–71.

[113] Sicard et Laignel-Lavastine, Un cas de trophoedème acquis, Soc. de Neurol., 15 janv., 1903, Nouv. Iconographie de la Salp., janv., 1903.

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certain states of hardening of the skin associated with various affections of the central nervous system, or of the sympathetic or of the ductless glands, and the part which relates in their genesis to disturbances of nutrition in general and the endocrine system and the sympathetic in particular."[114]

2. Endocrino-sympathetic Syndromes

I will only retain from among the above-mentioned syndromes exophthalmic goiter, Addison's syndrome, scleroderma and diabetes mellitus by reason of their double interest, which is both doctrinal and practical, and of the large number of studies that they have occasioned, and are still causing every day.

(1) Basedow's Syndrome

I have nothing to say concerning the immense bibliography of exophthalmic goiter, for which I refer you to Biedl's work on the subject and the recent report of Roussy at the Congress of Luxembourg (August, 1914). I will simply state that instead of taking sides for the thyroidal theory whose last favorable pleading was sustained with excellent arguments by Roussy and Clunet,[115] or for the sympathetic theory defended by Gley and Cleret,[116] with the aid of arguments drawn from experimental and anatomo-clinical facts, one[117] of which is personal to myself, I prefer to say that it is the same with Basedow's syndrome as with all the endocrino-sympathetic syndromes, that they are all the expressions of a disturbance of function, and that this function is disordered as well by a glandular lesion as by a disturbance of its nervous regulating mechanism.

From a physiological viewpoint I reiterate, therefore, the unity of the Basedovian syndrome in its divers clinical modalities.[118]

The cases due to thyroidal lesions are certain. I argue no more. The cases due to nervous disorders appear no less often.

Curschmann[119] has seen in a woman tabetic an intermittent Base-

[114] Laignel-Lavastine et Viard, Adipose segmentaire des membres inférieure, Soc. de Neurol., 11 juill., 1912; Nouv. Iconographie de la Salpétrière, 1912, No. 6.

[115] G. Roussy et J. Clunet, Les les du Corps thyroide dans la mal de Basedow, Annales de med., t. 1, No. 4, avril, 1914, pp. 395–438.

[116] E. Gley et Cleret, Recherches sur la pathogenie du goitre exophthalmique, J. de Physiol. et de Pathol. gen., 1911, p. 928, et Cleret, These, 1912.

[117] Laignel-Lavastine et Bloch, Syndrome de Basedow chez une tuberculeuse, Arch. gen. de med., sept., 1904, pp. 2456–61.

[118] L'epreuve de l'hypophyse (ralentissement du pouls chez les Basedowiens, decouverte par Claude et ses eleves (Soc. de med, des hop., 19 juin, 1914) permet de limiter, dans le meme esprit, le syndrome de Basedow.

[119] Curschmann, Sur des symptomes basedowiens intermittents (dans les tabes et l'asthme bronchique). Zeitschrift f. klinische medizin, 1912, LXXVI, 3–4.

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dovian syndrome coincident with gastric crises. He saw in this a sympathicotonic sign, and he was not far from siding with the opinion of Morat and Abadie, who saw in the lesion of the thoracic sympathetic the starting point of the Basedovian syndrome.

The beneficial influence exercised by adrenalin on the crises is to be noted.

This fact is contrary to the theory of Gottlieb-O'Connor, according to which the thyroidal sceretion sensitizes the terminal organs of the sympathetic.

It is explained on the other hand by the researches of Elliot and Durham, who established the fact that after an injection of adrenalin excitation of the splanchnic nerve caused a lowering of the blood pressure instead of the normal elevation, and this exists also in gastric crises.

Being more synthetic than analytic, looking at things physiologically and not anatomically or etiologically, I conclude that the Basedovian syndrome in its fundamental mechanism is an endocrino-sympathetic syndrome, whose divers clinical types arise from various lesions, at times endocrinal (always thyroidal, sometimes thymic, ovarian, parathyroidal, etc.), at others nervous (cervical or bulbar sympathetic) under the dominance of intoxications or infections acute or chronic, either general or local, of which the most frequent are acute articular rheumatism and tuberculosis.

(2) Addison's Syndrome

Thus from a case of Addison's syndrome without appreciable gross lesions of the suprarenals (1899) I wrote my thesis[120] in an endeavor to demonstrate that there were Addisonians in whom nothing was to be seen except lesions of the sympathetic, in whom the suprarenal disturbances were secondary to nervous changes, and who showed all the intermediary signs of the melanodermic[121] tuberculosis. To the anatomical theory of the Addisonian discoloration I put in opposition a more comprehensive physiological theory and to the lesional contingency the functional necessity.

The recent observation of N. Pende and Varvaro[122] came to the support of this point of view. They have seen in a man of thirty-six years of age an Addisonian syndrome secondary to a rapid pulmonary tuberculosis. At autopsy the suprarenals were normal in their make-up. In the cortex the spongiocytes were rare, and pigment was almost completely lacking in the reticular zone.

[120] Laignel-Lavastine, Recherches sur le plexus solaire, Thèse, 1903, p. 420.

[121] Laignel-Lavastine, La mélanodermie des tuberculeux, Soc. méd. des hôp., 29 janv., 1904, et Arch. gén. de méd., oct., 1904, pp. 2497–2520.

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At the level of the solar plexus there were two aberrant suprarenals of normal structure. The ganglia of the solar plexus were free from tuberculous lesions, but they were of notable size, and examined histologically they appeared poor in sympathetic nerve cells and rich in new-formed connective tissue. The nervous elements still seen presented pigmentary atrophy.

To-day one differentiates the primitive Addisonian syndrome of slow and progressive evolution from the secondary Addisonian syndrome, which is seen in the already more or less advanced tuberculous cases, and which has a less clearly defined symptomatology.

Pende and Varvaro think that in the first case the anatomical substratum has its seat in the suprarenal, and in the second in the region of the solar plexus. Their reported case is a type of the secondary Addisonian syndrome.

Porak and myself have observed a case which anatomo-clinically was quite similar.

Thinking physiologically[128] one can conclude that the Addisonian syndrome is the expression of a certain degree of chronic suprarenal insufficiency with a disturbance of adreno-sympathetic pigmentary regulation.

In this adreno-sympathetic syndrome one can differentiate two anatomo-clinical forms: one form with predominance of the suprarenal lesions, it is the most frequent, and in general is clinically primitive, the second form with predominance of the sympathetic, periadrenal, solar or splanchnic lesions. It is less frequent, often fruste, and in general is clinically secondary to a pulmonary pthisis.

(3) Scleroderma

The absence of the thyroidal sign of Vincent in acute articular rheumatisms followed at first by Basedow's syndrome, and later on by evidences of thyroidal atrophy with the appearance of scleroderma, which sometimes is apparently arrested by thyroidal medication, has caused a belief in the existence of a scleroderma due to thyroidal disturbances of rheumatic origin.

This endocrinogenic form of scleroderma is not to be questioned. It is quite possible that it is not the only one, and that other

[122] N. Pende et Varvaro (de Palermo), Maladie d'Addison avec intégrité apparente des glandes surrénales et avec hypertrophie des glandes surrénales accessoires, La Riforma medica, Nos. 40 et 41, 4 et 11 oct., 1913, pp. 1093 et 1124.

[123] La communication recente de Hirtz and Debre (Addisonien observe en 1902 considere comme gueri, retrouve en 1913, autopsie), a la Soc. med. des hop., le 26 juin, 1914, et la discussion que suivit entre L. Bernard, Netter et Sergent (3 juillet, 1914, p. 20), ne contredisent pas mes conclusions.—Voir de plus Fayolle, Thèse, 2 juillet, 1914.

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endocrinal disturbances are capable of producing scleroderma or add their action to that of the thyroid[124] in its causation.

In addition, in spite of Touchard,[125] it seems very difficult to do away with a sympathetic factor in certain cases.

Referring to an association of Basedow's syndrome and scleroderma, G. Marinesco and Goldstein[126] say that it is "evident that the sclerodermic syndrome does not depend entirely on a disturbance of thyroidal function, but that this disturbance exercises a certain action on the sympathetic system, and brings about in this way the appearance of the scleroderma." There are cases, as they say, which confirm all the pathogenetic theories: the trophoneurotic, the angiotrophoneurotic, the sympathetic, the vascular, the pituitary, the thyroidal and the pluriglandular. However none of these theories can be applied to these cases as a whole.

Gauthier[127] distinguishes two forms of scleroderma, the ordinary, depending upon hyperthyroidism, and a special type, with a less parchment-like skin and having subcutaneous fat, depending upon hypothyroidism.

Cassirer[128] puts in the list of the vegetative syndromes the vasomotor and trophic neurosis, among which he classifies scleroderma.

Marinesco and Goldstein consider that the thyroidal secretion acts in the cases accompanied by Basedovian symptoms, as well as in those with other thyroidal manifestations, through the sympathicotrope action of that secretion.

The connections and even the associations of certain sclerodermas with Basedovian and Addisonian syndromes compel me to admit that if in the first place scleroderma is an endocrinal syndrome, it is also sometimes a vegetative syndrome, and that consequently it has the right to be quoted among the group of endocrino-sympathetic syndromes.

(4) Diabetes Mellitus

Diabetes arises from a disorder in the regulating mechanism of the sugar function. Glycosuria, the most frequent disorder of this function, is at first heading an endocrino-sympathetic syndrome.

[124] Voir à l'appui: Laignel-Lavastine, Sclérodermie mélanodermique, Soc. med. des hôp., 31 janvier, 1908; Dupré et P. Kahn, Sclérodermie et mal. de Raynaud, Soc. méd. des hôp., 11 juin, 1909; Chantemesse et Coureoux, Sclérodermie avec atrophie thyroïdienne et mélanodermie, Soc. méd. des hôp., 3 juill., 1914.

[125] Touchard, Thèse, 1906.

[126] Marinesco et Goldstein, Syndrome de Basedow et Sclérodermie, Nouv. Iconographie de la Salp., juill.–aout., 1913, pp. 272–290.

[127] Ch. Gauthier, Fonct. du corps thyroïde, R. de Méd., 1900, p. 442.

[128] Cassirer, Die vasomotorich-trophischen Neurosen, 2° ed., 1912, pp. 536–700.

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Without going into the secretion of sugar by the liver, which was the first internal secretion known, or into the influence of the internal secretions of the pancreas on sugar metabolism, it suffices to mention adrenalin glycosuria as well as suprarenal diabetes to show the existence of glycosuria of endocrinal origin.

In addition McLeod, after Cavazzini, has laid stress on the glycosuria following excitation of the great splanchnic and on the fact that puncture of the bulb in the normal dog is without effect after section of the splanchnic nerves.

There is need therefore of a sympathetic factor in the production of certain glycosurias.

Finally in the decapsulated dog puncture of the fourth ventricle (Mayer), as well as stimulation of the splanchnic (Gautrelet and Thomas), does not produce glycosuria. This proves the need of a double endocrino-sympathetic factor in certain glycosurias.

One can conceive, therefore, the possibility of diabetic cases, endocrino-sympathetic syndromes, in which sometimes either the endocrinal factor or the sympathetic factor seems to predominate.

3. Psycho-neuroses

I indicated in 1908 the importance of endocrine disorders in the psycho-neuroses. Facts published since then in the literature and my personal practice have confirmed me in my opinion. One part of functional neurology comes under the heading of endocrino-neurology to-day.

This subject will be found worthy of great elucidation. I can not go into it here, and will say but a word regarding endocrine disorders among the "nervous," the neurasthenics, the hysterics, the psychasthenics and the epileptics.

(1) Nervousness

It will be interesting clinically, said I in 1908, not to stop at a simple semiologic diagnosis in the presence of a neurosis, but to inquire into the reasons for the irritable weakness of the nervous system in the general functionating of the organism, and from this point of view not to neglect the examination of the internal secretions.

The Viennese School, especially Eppinger and Hess,[129] in the neurosis of Oppenheim, have distinguished the two clinical types of vagotonics and sympathicotonics, the relationships of which they

[129] H. Eppinger et L. Hess, Die Vagotonie, Sammlung klinischer Abhandlungen über Pathol. u. Therap. der Stoffwechsel u. Ernährungsstörungen, f. 9–10, Berlin, 1910. Tr. Kraus and Jelliffe, Neurological Monographs.

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have striven to connect with such and such disturbances of internal secretion. Their remarkable description of vagotonics, which is classic to-day, has been translated or recapitulated in all languages. I refer you to these works.[180]

Before that Léopold Lévi and H. de Rothschild[181] had prepared the way with their excellent study on thyroidal neuroses.

In a number of cases the clinical types of neuroses, such as the vaso-motor habitus of Savini[182] or the emotional constitution of Dupré,[183] come under the heading of thyroidal neuroses, and from a diagnostic standpoint the joining of a simple clinical type to an endocrino-nervous syndrome is a step forward, because one enters a little further into the understanding of the morbid mechanism.

Moreover a good many vagotonics, like a good many sympathicotonics, also come under the heading of dyshyperthyroidal neuroses, and these different effects arising from the same endocrine disorder —supposing that it always is the same—should not cause amazement.

They are on the same order as the facts which were noted by Asher and de Rodt[184] in their experiments on the thyroidal secretions. According to the individual peculiarities of the animals, it was sometimes the action on the vagus and sometimes the action on the sympathetic that predominated. In addition the effect of an injection of thyroidal extracts depended in great measure on the degree of excitability of the nerves of the animal experimented upon.

This observation seemed to me as being of extreme importance and of a general application. In pointing out more or less marked reactional phenomena in the nervous system as being hand in hand with certain secretions with which they are for the moment more or less in accord, evidence is given of the dangers of too hasty inductions relative to the action of the endocrine secretions on the separate parts of the nervous system and to their specific elective action, which are to a certain extent antagonistic.

There are not only thyroidal neuroses allied with all the modalities of stimulation or insufficiency of thyroidal secretion, but dis-

[180] Cheinisse, Sem. méd., 20 nov., 1912, pp. 553–556; W. M. Kraus et S. E. Jelliffe, J. of Nerv. and Ment. Disease, mars, avril, mai, 1914, p. 164.

[181] Léopold Lévi et H. de Rothschild, Etude sur le corps thyroïdien.

[182] E. Savini, Le type constitutionnel sympathique ou vaso-motor, Progrès médical, 15 fév., 1913, pp. 82–85.

[183] E. Dupré, La constitution émotive, Paris méd., 7 oct., 1911, p. 404.

[184] L. Asher et M. de Rodt, Innervat. des gl. à sécrét. int. et act des produits de sécrét. int. sur le syst. nerv., Soc. suisse de Neurol., 11–12 nov., 1911.

Rev. méd. de la Suisse romande, XXXII, No. 2, p. 183, 20 fév., 1912.

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turbances of the ovaries, testicles, suprarenals and the pituitary may be the origin of beginning neuroses.

This idea of an attempt to discover the endocrinal disturbance before the neurosis becomes sufficiently marked to be morbid allow-one perhaps to restore an equilibrium to these nervous temperaments through an organotherapy, which is to a certain extent prophylactic.

They are helped in this way before, to use a vulgarism, they have had a chance to get the habit of the disease.

Finally among "the nervous" endocrine disorders may be in their turn secondary to nervous disturbances. These secondary neurogenous endocrinal symptoms must not be confounded with primitive endocrine disorders—the causes of the nervous disorders. This intricacy is common among the hyposphyxics of Martinet; I have under observation at the present time a nervous woman with hyposphyxia and hypothyroidism, whose extremely low arterial tension is improved more by small doses of thyroid than by suprarenal, and I believe that it is through a nervous influence that the thyroidal insufficiency of scarlatinal origin reacts upon the suprarenal.

After what I have said concerning endocrinogenic asthenias I will be very brief as regards neurasthenia of endocrinal origin. Since attaching the importance to it that I did in 1908, I have searched for it regularly in my practice, and have often found it. The forms connected with adrenal and genital insufficiency (diastematic and prostatic) seem to me to predominate in the male, and the forms connected with ovarian and thyroidal[135] insufficiency to predominate in the female. Certain neurasthenias of infectious origin, such as the tuberculous, syphilitic, and gonorrheal, result as much if not more from the endocrinal insufficiency caused by the microbes than from the toxines produced by them directly.

These endocrine disorders which cause neurasthenia must not be confounded with the secondary neurogenous endocrinal symptoms, which are often seen in neurasthenias, and which bear mostly on the vegetative nervous system.

The two disorders—endocrinogenic neurotic and neurogenic endocrinal—often coexist, and by their intricacy complicate the clinical picture. The analysis can be gotten at through the therapeutic results.

[135] Allen Starr, Neuroses depend upon errors of inter. secret. of the ductless glands, Med. Record, 20 juin, 1912.

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(3) Hysteria

Hysteria, whatever the idea may be that one holds in regard to it,[186] is observed among "the nervous."

I have shown the frequency of neuroses of endocrinal origin. I believe that I can class the disorders of internal secretion among the predisposing causes of hysteria through the intermediary of nervosity. As a matter of fact I have often found endocrinal disturbances, especially of the thyroidal or ovarian type, among hysterics.

(4) Psychasthenia[187]

Etymologically psychasthenics should be classed among the neurasthenics in whom the asthenia bears especially on the psychic sphere.

But following along with Raymond and Janet we class especially as psychasthenics those who, on the whole, are obsessed.

When one follows these cases one sees that their paroxysmal blustering syndromes are nothing but the morbid offshoots of deeper variations of nervous tonus or psychic tone. These changes in women are nearly always connected with the sexual life. In man one finds them running parallel with such symptoms as headache, insomnia, hyper- or hypotension, tachycardia and constipation, which frequently can be connected with endocrinal disorders.

Thus among the predisposed, obsessions, which might be regarded as a mental autonomic syndrome, are often nothing but the psychic expression of a more or less diffuse anxiety which in itself is the result of a disturbance of the sympathetic system of endocrinal origin. Thyroidal excitation particularly, by increasing the irritability of the peripheral sympathetic centers which it controls, predisposes to these dissociations of personality. The thyroid, so to speak. is an anarchistic emancipator.

Be that as it may, the variations in nervous and psychic tone thus determined may react secondarily on all the vegetative functions not forgetting the ductless glands, and can thus establish a vicious circle.

(5) Epilepsy

It is always wise in the diagnosis of an epilepsy after becoming advised as to the causes explaining the cortical changes to pass in

[186] Laignel-Lavastine, Les réactions anti-sociales des hystériques, Paris Médical, 30 mai, 1914.

[187] Schnyder, L., R. méd. de Suisse romande, oct., 1913; Lubetzki, S., R. de méd., août, 1913.

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review the reasons for the organic poisoning and among these not to overlook the glandular disturbances. The search for the minute signs of these disturbances may thus institute the use of one glandular therapy rather than another. It is most often the thyroidal disturbances that are revealed in endocrinal disorders among epileptics.

Many subsequent works[138] have confirmed this conclusion in my report of 1908.

Sometimes they are hypothyroideal in type and sometimes dyshyperthyroideal. This is not contradictory. The endocrinal disorder, according to the statement of Léopold Lévi, "is the pathological mordant that sensitizes centers already predisposed." The endocrinolepsy,[139] whatever form the crisis may take, is set free by a complete rupture of the endocrinal equilibrium. The incidental causes alone are different. Thus in a still unpublished lecture[140] on the thyroid body and epilepsy pertaining to a confusional epileptic stupor seen in a tuberculous heredo-alcoholic Basedovion, I showed that the crisis coincided with and followed her menstrual periods, while with her hypothyroidal sister they preceded them as a rule, and were absent during pregnancy.

In the epileptic seizures of thyroidal origin, therefore, I wish to differentiate the dyshypothyroideal crises from the dyshyperthyroideal[141] crises; these latter discharges moreover possibly surviving in all three forms of thyroidal instability.

4. Temperaments

Temperament, as I said at Dijon in 1908, is the dynamic characteristic of the organism, just as constitution is the static characteristic. Following this conception of Professors Bouchard, Landouzy and Roger it can be stated that what one is to physiology the other is to anatomy. Now it appears to me that among the various func-

[138] Sicard, Journ. de med. de Paris, 1912; Gelma, Rev. de med., 10 janv., 1913, pp. 26–39. Guilton, Contrib. à l'ét des symp. épileptiques dans les états thyroïdiens, Th., Montpellier, 1913, No. 58; Enzière et Margarot, Soc. de sc. méd. de Montpellier, 2 mai, 1913; Silvestri, Opothérapie surréno-médull. et épilepsie, Il Policlinico, 29 juin, 1913, pp. 917–922; Dufour et Legros, Syndrome hypo-ovarien et hypo-thyroïdien. Crises épileptiformes (vagotonie), Soc. méd. des hôp., 27 mars, 1914; Bolten G., Monatsch. f. Psych. u. Neurol., 33, No. 2, fév., 1913; Claude et Schmiergeld, Encéph., 10 janv., 1909.

[139] Léopold Lévi, Les endocrinolepsies, Soc. de méd. de Paris, 9 janv., 1914, p. 44.

[140] Laignel-Lavastine, Clinique psychiatrique, 22 mars, 1914.

[141] Ces crises me paraissent vraiment rythmées par les règles quoi q'en disent Toulouse et Marchand (R. de Psychiatrie, mai, 1913).

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tions, the individual varieties of which have to do with temperaments, those of the internal secretions should not be neglected, and when one decides to take up the long-forsaken study of temperaments in accordance with the classical types—the sanguinary, the nervous, the lymphatic and the bilious, one might discern perhaps the thyroidal, the pituitary, the adrenal, the ovarian and diasthematic, etc.

This view of the question is but the application to the internal secretions in relation to temperament, of the masterly conception of Prof. Charles Richet expressed at the Congress of Vienna in 1910: "We are as yet but at the portal of that chemistry of the imponderable, founded on the analysis of biological functions, and although we can already foresee some of the results, we are soon led into a region in the study of the physiology of the individual, which until to-day was almost unexplored," that physiology which, in my lecture at the opening of the course on medico-legal psychiatry in 1910, I called the differential psychology, and I linked differential psychology with the knowledge of character and differential anatomy with the knowledge of constitution.

Since then the idea has been greatly amplified, and Prof. N. Pendé[142] has allotted a chapter to it in his remarkable report of 1912 on the internal secretions. As a clever clinician he has related the constitutional vascular hypotonia of Ferrannini with the thymo-lymphatic state of Paltauf or the asthenic or hypoplasic constitutional state characterized by hypoplasia of chromaffin and genital tissue combined with hyperplasia of lymphatic and thymic tissue.

Then again he believes that he can connect the vagotonia of Eppinger and Hess with the exudative diathesis of Czerny.

He considers the lymphatic and thymo-lymphatic states to which he adjoins the chlorotic state as an organic immaturity of the endocrinal system in its chromaffin and genital parts contrasting with excessive development in the same system of its lymphatic and thymic parts. He recalls the antithesis established by Viola between the apoplectic or short or megalosplanchnic habitus with the phthisical or long or microsplanchnic habitus. He adds that very frequently hypothyroidea coincides with the megalosplanchnic habitus and hyperthyroidea with the microsplanchnic. Remarking also that

[142] Rapin, Angioneuroses familiales, R. med. de la Suisse romande, 1907, p. 196.—G. Maranon, R. de med., mars, 1914, p. 180.—Falta, loc. cit., p. 39.—Léopold Lévi, Familles thyroïdiennes et dysendocriniennes.

[143] N. Pendé, Le secrezioni interne nei rapporte con la clinica XXII° Congresso di Medicina Interna in Roma, oct., 1912.

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he has often seen signs of vagotonia among the megalosplanchnics and of sympathicotonia among microsplanchnics he deducts this double equation: vagotonia-megalosplanchnia-hypothyroidea; sympathicotonia-microsplanchnia-hyperthyroidea.

Pendé very prudently does not advance these considerations except as a means of indicating the road to follow, and in fact this classification seems to me to err through too great a desire for symmetry and by too static a conception of the notions regarding vagotonia and sympathicotonia.

These predominances as a rule only express the evolutional moments of the individual. Thus when asleep at night we are all vagotonics. The adult and the aged differ more from the child than the sleeping man from the awakened. Their vegetative nervous formula has therefore the chance of not remaining the same all during life.

If I criticize the too sharply drawn lines of the theoretical elucidation I share, as I have already said, in the directing idea. It is moreover essentially French. Léopold Lévi and H. de Rothschild have been the first to deserve the credit for connecting the classical neuro-arthritic diathesis with hyperthyroidism.[144] It is true that prior to that time Hertoghe classed adenoid cases as among the hypothyroidal, and opened the way for the classification of many lymphatic temperaments among cases of hypothyroidism.

Another step along the trail brings us to the diatheses of Bazin—a masterly conception and a very true one, which the fancies of the pastoral era had caused to be forgotten, but to which we bring back the analysis of temperament in the light of endocrinology.

Finally I must recall that Lancereaux, when he saw in the sympathetic the principal factor in herpetism, had in advance the intuition of the ties which unite endocrino-sympathetic disturbances with temperaments.

To-day I believe it possible to enlarge and clarify the question a little, thanks to what I have called, in a clinical lecture, the endocrino-diagnosis of temperaments; an endocrino-diagnosis which must be worked out according to the method of glandular tests of Claude and his pupils, and which will allow one to depict a series of types. This series of types will depend on thyroidal or ovarian or testicular or pituitary or suprarenal temperaments more or less clearly defined, according to the more or less marked predominance of one or of several of the glands of internal secretion in the endo-

[144] Léopold Lévi, Neuro-arthitisme et gl. endocrines, Mouv. méd., mai, 1913.

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crinal equilibrium. I expect to publish in the near future a description along these lines of the principal temperaments.

5. Character[145]

Character, to my mind, as I said in 1908, is nothing but the psychological expression of temperament. Constitution, temperament, character are thus but three expressions—anatomical, physiological and psychological—of the reactional coefficient of the individual.

"The importance of individual varieties of internal secretions will be seen again therefore in characters. The laity have long spoken of good or bad humor in their spontaneous psychology and also of humor in medical parlance. This identity of terminology seems to me to conceal a profound meaning, which the study of the internal secretions uncovers. These secretions by their variations react on the mental life as well as on the rest of the organism, and manifest themselves at first and above all by changes of humor, modifications of affective life, because the latter rather than motor or especially intellectual activity depends on organic life from which it can scarcely be separated.

For a long time my observations have done nothing but confirm me in my opinions. The choleric are such only through the thyroidal temperament, just as the lazy are such only through suprarenal hypoplasia.

Nevertheless, even if an endocrinal factor often enters into the formation of character, I do not claim that it always does so, and many other elements play a primordial rôle in such formation. In addition the law of constancy allows the establishment of relationships between morphological and psychological series which are by no means causal. This is what Bergson has caught a glimpse of in his Creative Evolution, when he says that each physiological disposition is a necessary but not a sufficient condition for each psychic state, and that it is possible to have many psychic states from the same physiological state of the cerebral gray matter.

Conclusions

1. From a morphological standpoint there exist clearly defined connections between the nervous system and certain glands of internal secretion, especially between the sympathetic and the chromaffin systems.

[145] Kollarits Jeno, Charakter und Nervosität, Budapest, 1912.

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2. From a physiological standpoint experimentation has shown that stimulation or predetermined sections of the central or peripheral nervous system modify certain internal secretions and conversely that changes produced in these secretions or the injection of their hormones, where such are known and isolated, modify the nervous functions, particularly the excitability of the vegetative system, with predilection sometimes for the autonomic and sometimes for the sympathetic. The School of Vienna deserves the credit for having shown the importance of these elective relations.

3. From a pathological standpoint much less is known as yet than one would suppose. The truth of the endocrino-nervous relationships should not be admitted without a critical analysis bristling with facts. Nevertheless it can be said that

1. Nervous disorders exist due to disturbances of internal secretion, and disturbances of internal secretion exist due to nervous disorders.

ENDOCRINO-NERVOUS RELATIONSHIPS

- *A.* Coincidence.
- *B.* Association.
  - 1. Proximate.
  - 2. Mediate.
- *C.* Causality.
  - 1. Simple...
    - 1°. Endocrino-nervous.
      - (1) Direct.
      - (2) Indirect through intermediary.
        - 1. Morphological evolutional.
        - 2. Morphological humoral.
        - 3. Physiological humoral.
        - 4. Physiological nervous.
        - 5. Psychological.
    - 2°. Neuro-endocrine.
      - (1) Direct.
      - (2) Indirect through intermediary.
        - 1. Morphological evolutional.
        - 2. Physiological reflex.
        - 3. Psychological.
        - 4. Motor activity.
        - 5. General nutrition.
  - 2. Double...
    - 3°. Endocrino-neuro-endocrine.
    - 4°. Neuro-endocrino-nervous.

2. The two-fold critical analysis of the neurological and particularly the endocrinological methods of investigation permits, in the midst of the unknown, the redemption of certain definite relationships between the endocrinal and the nervous disorders.

3. Until more ample investigation it seems to me that these relationships might be expressed in the following table.

In practice the great aid that endocrinology brings to the study of neurology and especially functional neurology manifests itself particularly in the clinical study of

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1. Ordinary symptoms, such as asthenia, headaches, insomnia, anxiety, sweats, constipation, arterial hypertension and obesity.
2. Endocrino-sympathetic syndromes, such as Basedow's syndrome, Addison's syndrome, scleroderma and diabetes mellitus.
3. Psycho-neuroses.
4. Temperaments.
5. Characters.

Endocrino-diagnosis of temperaments, particularly through glandular tests and sympathico-vago-tonic examinations, in penetrating the familial heredity, will allow us to use prophylactic measures in combating diatheses and in combating certain of the factors, the humoral and neuro-vegetative factors for instance, which are formative of character.

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